



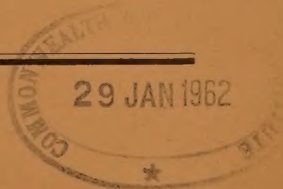
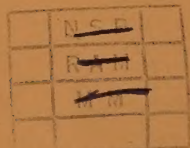
TANGANYIKA

MINISTRY OF AGRICULTURE AND CO-OPERATIVE
DEVELOPMENT

Annual Report
of the
Department of Agriculture
1960

PART I

1961
PRINTED BY THE GOVERNMENT PRINTER
DAR ES SALAAM
Price Shs. 5/-



Annual Report
of the
Department of Agriculture
1960

PART I

CONTENTS

	PAGE
I. INTRODUCTION	1
II. WEATHER	1
III. MAIN CROPS:	
Sisal	2
Coffee	3
Cotton	4
Cashewnuts	6
Cassava and Sweet Potatoes	6
Coconuts, Copra and Coir	7
Maize, Sorghum and Millets	7
Oil Seeds	7
Paddy	8
Pulses	8
Pyrethrum	9
Seed Beans and Seed Peas	9
Sugar	9
Tea	10
Tobacco	10
Wattle	11
Wheat	12
IV. MINOR CROPS	12
V. INCREASED PRODUCTIVITY SCHEMES	14
VI. VERMIN AND GENERAL PESTS	16
VII. LAND PLANNING, SOIL AND WATER CONSERVATION AND LAND USAGE SCHEMES	17
VIII. IRRIGATION	19
IX. ANIMAL HUSBANDRY	20
X. ANIMAL DRAFT AND MECHANIZATION	20
XI. STAFF TRAINING AND AGRICULTURAL EDUCATION	21
XII. AGRICULTURAL EXTENSION METHODS	22
XIII. FISHERIES	24
XIV. RESEARCH	26
XV. NUTRITION	28
XVI. LEGISLATION	28
XVII. BOARDS AND COMMITTEES	29
XVIII. STAFF... ..	29
XIX. POLICY	30
XX. CONCLUSION	30
APPENDIX I. Rainfall... ..	31
APPENDIX II. Crop Production Figures	32
APPENDIX III. Exports	38

TANGANYIKA

ANNUAL REPORT OF THE DEPARTMENT OF AGRICULTURE, 1960

Part I

SECTION I

INTRODUCTION

1960 was a year of steady development in agriculture. Weather conditions were generally good, there were no food shortages and there were record crops of mild coffee, pyrethrum, tea, wheat, sugar and cashew. There was, however, a failure of the November/December rains in many areas which will mean poor crops and even food shortages in these areas in 1961. Produce prices were generally lower than in 1959 and the heavy price drop in maize, paddy, Robusta coffee and cassava caused considerable dissatisfaction among farmers.

The steady improvement in relationships between the staff and the farmer was maintained. Every encouragement was given to the emergent yeoman farmer who was prepared to follow advice, use improved methods and have his farm planned. In the early part of the year there was a certain lack of confidence in the future among non-African farmers, but confidence was to some extent revived by the steady progress of political development and the almost total lack of serious incidents.

An important event in the agricultural year was the drawing-up of the Three-Year Development Plan, involving a greatly increased educational programme leading to development of both the extension and research sides of the Department; this should in turn lead to much greater production of cash crops. The increased productivity schemes for seed peas, Turkish tobacco, cocoa, tea, and irrigation (in Arusha), made a good start, but the hibiscus development and the preparation of the stock-holding ground were held up. The twenty-nine increased production schemes begun in 1958 were either incorporated into general extension work or closed down. The four Regional Research Stations were completed and work began on an increased number of sub-stations and on training staff and improving equipment.

The expansion of the educational programme involves plans for an Agricultural College, the Galanos School near Tanga, Farm Institutes in each province and the expansion of agricultural training at Ukiriguru and Tengeru. An intensified plan for training local staff to fill more important positions in the Department is under way.

The Lake Victoria Fisheries Service in Tanganyika waters is now incorporated in the Fisheries Division of the Department. Encouraging progress is reported in both inland and sea fisheries. The special services of Land and Farm Planning and the Tanganyika Agricultural Machinery Testing Unit, had a satisfactory year, but the Mechanical Services met serious setbacks. A start was made on a Horticultural section of the Department.

1960 was a particularly difficult one from the staff aspect. Losses of experienced senior staff and the absence on courses of many officers meant that several districts and stations worked well below normal strength and, in many places, reasonable continuity was impossible. The Department also lost several of its best and most experienced clerical staff. I am deeply grateful to the staff of all grades who have worked with continued zeal, conscientiousness and sense of responsibility, despite uncertainty of the future and over-frequent transfers.

SECTION II

WEATHER

The weather during the growing season 1959/60 and the calendar year 1960 was very variable. The general picture was of more than average rainfall but bad distribution. Excessive rains in February-April led to extensive flooding, disruption of communications

and heavy loss of crops in certain areas, for example, cotton in East Lake. The rains during the growing season were generally good, but ceased abruptly in May and the dry season was unusually severe, causing damage to crops, e.g., sisal at Kilosa and chick pea in Lake Province. Severe storms damaged crops in Southern Province and Bukoba.

Rainfall figures are given in Appendix I.

In general, crops were good except when they were waterlogged or planted too late. Food crops were adequate in most areas, but there were mild food shortages in East Handeni and northern parts of the Central Province.

The rains for the 1960-61 season started very late and where short rains were expected in the north they failed to materialize. As soon as the failure or partial failure of the November/December rains was apparent, farmers were encouraged to plant maize, beans and sweet potatoes in valley bottoms, seepages and other favoured areas, to increase future food supplies. The prospects for most cash crops in 1961 are much poorer than in 1959 or 1960.

SECTION III

MAIN CROPS

Crop production figures or amounts of crops marketed are given in Appendix II and exports from Tanganyika in Appendix III. For crops such as sisal, coffee, cotton, tea and pyrethrum, there are properly organized markets and the figures can be given with confidence of their accuracy (apart from the unknown quantity of smuggled coffee). With crops such as cassava, maize and paddy much is locally consumed or sold outside the recognized markets so that figures are merely estimates. The Local Authority markets are playing a steadily, decreasing role in marketing peasant crops and the Co-operative Societies are increasing their range of produce marketing.

Sisal

The importance of sisal to Tanganyika is shown by the export value of £15,441,631 for 1960, i.e., 37 per cent of the agricultural exports of the country. The actual production was 204,868 tons from 444,101 acres cut, from a total area of 664,481 acres. Production fell compared with 205,273 tons last year and this may be attributed to the steady decline in the area planted to sisal each year since 1952. The total area under sisal continued to rise, as many of the older areas of low production have not yet been cut out.

The decline in new planted areas and a reluctance to cut out unproductive older areas for replanting stemmed largely from the instability of sisal prices following the boom years of 1950 and 1951. In 1960 the price was well maintained at about £100 per ton for No. 1 fibre. This may be reflected in an increased area of new planting next year.

The annual harvest of sisal does not normally depend on rainfall to any great extent as estates usually work to a production predetermined by area and factory capacity. It is possible, however, that the decline in production in 1960 was partly the result of two years of badly distributed rainfall and shortage of water for decortication. The total rainfall figures in 1959 and 1960 were well up to the average but an appreciably large proportion fell in short showers of high intensity, and some areas in Kilosa and Pare suffered from drought.

The subject of labour relations in the Sisal Industry continued to occupy a disproportionately large part of the growers' time. In spite of a revolutionary, and to the employees, highly favourable, new wages structure, the industry was beset with many strikes and labour disputes.

The Sisal Research Station at Mlingano continued work for the benefit of the industry notably on the maintenance of soil fertility. Results of many field trials showed that fertility could be maintained economically by the use of fertilizers. Leguminous cover crops played an increasingly important part in sisal estate practice and many estates have commenced planting small areas of *Pueraria phaseoloides*, *Centrosema pubescens* and *Dolichos argenteus*.

There was sufficient planting material of Hybrid No. 11648 to issue a small quantity to all estates, the object being to investigate how these plants would grow under different soil and climatic conditions. The initial few plants of this hybrid sisal at Mlingano grew very well and yielded over 10 tons of fibre per acre to date, from a plant population of 622 per acre. Whilst it is possible to apply our knowledge of conventional sisal to this plant, details of fertilizing, spacing and cutting must await the results of appropriate trials.

One African sisal grower in Eastern Province, who sold green leaf to a neighbouring estate, found it impossible to make a profit with the increased costs of labour.

The hedge sisal industry in Lake Province revived. An estimated 12-13,000 tons of hand-decorticated fibre, for which the peasant received 35-45 cents per lb., were delivered to the 21 small brushing and baling factories in the Province. Sisal poles sold at up to Sh. 1/- each. The hedge sisal crop was worth over £½ million, second only to cotton in value in the Province.

Coffee

The Arabica crop was a good one in the main producing areas of Northern Province, Southern Highlands Province and Southern Province, but the newly developed areas elsewhere are by no means insignificant. Coffee is now grown in every province and the emphasis is on Arabica. Robusta production decreased slightly. All mild coffees are Arabica and most of the hard coffees are Robusta.

Total exports of clean coffee amounted to 25,077 tons valued at £7,325,669 as compared with 19,607 tons valued at £5,745,438 in 1959.

Tanganyika agreed to join in the International Coffee Agreement restricting coffee exports to traditional markets for a trial period of one year, after which the position would be reviewed in the light of the Coffee Study Group's proposals for a long-term solution of the overproduction problem. Tanganyika is tackling the problem by emphasis on quality production, especially of mild coffees, and by encouraging local consumption of the cheaper coffees.

(a) Mild Coffee

Production continued to increase in most growing areas and in Northern Province the crop was the biggest ever. Production also increased significantly in Mbozi, Rungwe, Songea, Buha, and in the Eastern and Tanga Provinces.

The total production of mild coffee was 21,378 tons, of which 16,585 tons came from Northern Province, 2,996 tons from Southern Highlands Province and 1,135 tons from Southern Province. The total 1959 production was 14,646 tons.

The supervision of nurseries and the distribution of seedlings from Native Authority Co-operative and Departmental nurseries continued to occupy much of the time of the field staff in certain areas. In most areas the growers took advantage of the services provided and took reasonable care of the seedlings but in one or two instances in Moshi the nursery-men were driven off by uncontrolled crowds and many seedlings were torn up and destroyed. In the former Increased Productivity Schemes, the financial responsibility for nurseries was taken over by Co-operatives and Local Authorities except in Pare, where the people were reluctant to do so.

The response to the teaching of improved cultural methods was most marked in the newly developed areas where the crop was previously unknown, but there were also signs of response in some of the long established areas of Moshi and Arusha. In Moshi there was some systematic destruction of old trees and replacement by good seedlings.

Everywhere increasing numbers of farmers were mulching, pruning and providing wind-breaks, although there was a wide variation in efficiency. The Matengos coffee showed a high standard of culture. There was little increase in estate planting, though some estate owners greatly increased their production by overhead irrigation and other improved practices.

Spraying against pests and diseases was usually done by teams paid by the Co-operatives and supervised or advised by Agricultural Department staff, or undertaken by the farmers themselves. The use of D.D.T. or dieldrin against antestia increased the incidence of coffee berry moth, leaf miner and leaf skeletonizer, but no cheap and safe spray has been found which will destroy them all. *Hemileia* was widespread. Treatment of white stem borer was generally effective and the pest can be kept under control. Pests and diseases of coffee were severe in Tanga and the growers are not yet organized to deal with them. The increase of *Fusarium lateritium* in Southern Highlands Province caused concern and an experiment was laid down to find a method of controlling the disease.

The campaign to improve quality, and hence price, to the grower continued unabated. Co-operatives were encouraged and assisted to build central pulperies, e.g. at Ngyani on Meru, at Mhagawa in the Matengos and in Mbulu. Assistance was given to individuals or to

groups of growers in setting up hand pulpers and washing channels. This work was given a boost by the high premiums paid for washed coffee—for instance, in Mbozi there was a £15 per ton premium for those who had built washing channels and one parcel of African Mbozi coffee obtained a £50 premium over all local coffees. At the other extreme, poor coffees could scarcely be sold.

Most of the coffee was sold through co-operatives, though some was sold direct by the growers to licensed dealers. Marketing was on the whole satisfactory though there was some illicit dealing, notably in Rungwe. Almost all Arabica coffee was sold on the Nairobi auctions.

(b) *Hard Coffee*

The total production was 9,746 tons of clean coffee, as compared with 9,423 tons in 1959. Of this total about 7,069 tons are Robusta and 2,677 tons Arabica. The average price paid to growers of Robusta f.a.q. in Bukoba was £138 per ton (£141 in 1959), and of Arabica f.a.q. £254 per ton, the total value of all grades was about 1,539,189

The fall in price and the unfavourable position of hard coffees as compared with mild, led to tests being made to establish the economics of mild Robusta and Arabica and to convert to preparation of mild Arabica wherever the provision of water made this possible. An exporter offered a £15 per ton premium for a consignment as per sample, or pulped and washed coffee prepared by Field Officer, Ngara. Arabica growing is encouraged in preference to Robusta, whenever conditions are suitable.

The Bukoba Robusta crop totalled 5,966 tons (6,236 tons in 1959) and the Arabica crop 2,286 tons (2,354 tons in 1959). In Ngara (where biennial bearing is a feature) Arabica dropped from 320 tons in 1959 to 99 tons. The North Mara industry continued to benefit from the better cultural practices and preparation there. 32 tons of buni were sold in Nairobi at £104 per ton.

Agricultural Department staff continued to give assistance in nursery work and distribution of seedlings, although the co-operatives had financial control and usually administrative control of the nurseries. (Robusta nurseries in Tanga Province had unused stocks of seedlings, indicating a falling-off in interest there.)

There was a great variation in the quality of the cultural practices, though in general they were of a low standard in Bukoba and better in Ngara and North Mara. A scheme financed by the Local Treasury and supervised by the Agricultural Department in Bukoba for pruning of coffee by itinerant teams on payment was very successful—60,000 trees were pruned. Communal pruning under Departmental supervision became the common practice in Ngara. Departmental plots of rehabilitated coffee gave over three times the local average crop. Standards of coffee culture are low in Musoma and Ukerewe.

Control of coffee pests was usually financed by the co-operatives and supervised by Departmental staff. *Antestia* spraying was continued in Ngara, and insecticides distributed by Agricultural Department staff in Bukoba against white stem borer and other pests. Field trials were done to find effective and economic control of *Stephanoderes*.

Preparation for market showed definite signs of improvement in Bukoba and assisted in the general improvement in quality of that season's crop. Other factors were the comparative mildness of insect damage and the provision of extra screens at the Bukop factory. 91 per cent of Robusta and 92 per cent of Arabica reached f.a.q. standard in the Government coffee grading, as compared with 78 per cent for Arabica and 84 per cent for Robusta in 1959.

Marketing was almost entirely in the hands of the co-operatives. As a result of the heavy fall in Robusta prices, the local authority cess in Bukoba was withdrawn. An unknown quantity of coffee was smuggled over the border into Uganda, where the black-market price was twice the co-operative first payment, due to the Uganda price assistance fund.

Cotton

Early promise of yet another record year in Lake Province did not materialize due to the excessive rains in East Lake followed by heavy insect and disease attack and the sudden early cessation of the rains. The early estimate was 220,000 bales, but the final figure was about 160,000 bales which was the second best crop achieved. The crop in South Sukuma was a record.

The early enthusiasm in Bukoba largely evaporated due to heavy insect attack, but there was still keenness in Biharamulo and appeals were made to introduce or reintroduce cotton into several other districts. In Tanga Province production was variable, a few people using insecticides with very good results. In Southern Province, cotton production dropped to uneconomic proportions. In Northern Province there was considerable improvement, partly attributed to the co-operative societies with a record crop of 5,000 bales in Northern Province. In Western Province, enthusiasm was great in Nzeza and production increased rapidly. There was also a desire in Kigoma to grow cotton and this was fostered. In Central Province the growers in Iramba lacked experience and produced a poor crop.

The Eastern Province crop was very variable and the high production of about 16,000 bales was largely a result of the record crop in Rufiji, of about 6,500 bales. Quality improved in Rufiji, Ulanga and Bagamoyo and there were signs of improved cultivation methods being adopted. The general level of quality was fairly good with comparatively little grade C cotton.

The total production in 1960 was 188,571 bales, of which 160,652 bales came from Lake Province. These figures compare with 201,093 bales and 182,000 bales in 1959.

The estimated values of exports of lint, seed, seed cake and oil in 1960 were:—

	£
Lint	8,827,131
Seed	874,320
Seed cake	581,854
Oil	25,870
Total ...	10,309,175

Agricultural Department staff continued to preach early planting and weeding, use of manure and insecticides. In certain areas there was encouraging response to this teaching, Chilambola in Ulanga was an outstanding example.

Harvesting was again very incomplete and it is estimated that over ten thousand bales of cotton, mainly second grade, were left on the plant, worth over £120,000 to the growers.

Standards of grading varied considerably and many buyers were not strict enough in insisting on high standards of cleanliness. In Lake Province virtually all cotton was brought to the Co-operatives in cotton squares but jute bags were still widely used elsewhere despite continued propaganda. In Lake Province half the ginnery zones used wide-mouthed canvas bags in place of jute bags for transport to ginneries.

Transport to market became the responsibility during 1960 of the co-operative unions in the Lake Province. Some did not appreciate the complexity of the transport problem and the system broke down on several occasions. Another contributing factor was the poor state of the cotton tracks as sufficient labour could not be obtained to do the work. Co-operatives were developed in the other cotton growing areas, but most of them confined themselves to primary buying and the ginneries continued to transport the seed cotton from buying posts to ginneries.

The price of lint to the ginner, including an element for seed, was determined as before, but it remained Government policy to give the responsibility to the ginneries and co-operatives in Lake Province to negotiate the price at ginnery of seed cotton paid to growers. They were unable to reach agreement and the price to growers and remuneration to the ginneries was determined by the Cotton Board, as arbitrator. The price to growers was 54 cents per lb. grade A (less 2 cents co-operative dues and 2 cents local authority cess) and 20 cents per lb. grade C (less 2 cents co-operative dues). In the Coastal Province comparable prices were paid, with a small deduction for transport on long hauls.

Four new co-operative ginneries were built at Magu, Mhunze, Sola and Buyagu in Lake Province and a private ginnery at Same in Tanga Province replaced Sindeni. The ginnery at Msowero was not active and the cotton was ginned at Morogoro. The gins in the new co-operative ginneries were found to be unsuitable for Lake Province cotton and this resulted in expensive delays and the transporting of about 75 per cent of the cotton from the new ginnery zones to established ginneries. It is to be hoped that these gins will be modified so that standard quality lint and satisfactory outturn can be produced next season. Trials were started on the automatic feeding of the traditional type gins. Many ginneries installed improvements. Luguru ginnery was completely destroyed by fire and will be rebuilt.

In general, pests and diseases were not severe except in late-planted cotton. The excessive rains in East Lake division encouraged heavy insect and disease attack with the result that only half of the expected crop was harvested and quality was reduced. Dusting of seed against bacterial blight was general practice in Lake Province and was begun in Eastern Province at Kilosa Ginney. Trials to determine the safety of using mercurial dusts in place of cuprous dusts continued in Lake Province as mercurials were cheaper and more effective in the field. New continuous scroll dusters were tested against the present dusting drums.

Dusting and spraying of cotton against american bollworm was accepted on a larger scale among growers, particularly in Eastern Province. In Ukutu (Morogoro) yields were increased from 100 lb. grade A in unsprayed fields to 1,000 lb. in sprayed plots. Rats caused heavy damage in parts of Kisarawe and Morogoro.

Fusarium wilt continued to spread slowly in Lake Province causing complications in the seed dusting and distribution programme. A field survey was done by Agricultural Department staff under the direction of Dr. Perry of Namulonge who did field researches himself on the causes and possible control of the disease. *Verticillium* appeared in Northern Province. Uprooting and burning was carried out reasonably well. There was no active resistance to this work, although laggards had to be persuaded to do it.

Demands for seed for the 1960/61 season's planting were high, for instance between 11,000 and 12,000 tons were distributed in Lake Province—a 20 per cent increase on last year.

The seed strains issued were:—

Uk.58—part of Ushashi.

Uk.55—Mhunze zone.

Uk.51—Rest of Lake Province.

Western Province.

Korogwe.

BP.52—Northern Province.

Same.

11.58—Morogoro, Kilosa, Malinyi and part of Mandra.

47/10—Other parts of Eastern Province.

Cashewnuts

Cashew production continued to increase rapidly in all coastal districts and to be grown further inland. Agricultural Department staff assisted with good seed and advice on culture. Care of the trees slowly improved as growers appreciated that weeds, fire and overcrowding reduce yields. The severe storm in December, 1959, did less damage than was feared, in Southern Province.

In 1960 the crop was a good one, 55,252 tons were marketed, of which 41,288 tons came from the Southern Province. The total value of the crop to the grower was about £2,099,576.

Attempts were made to improve the marketing and to give an incentive to produce a better quality, so far with little success. Prices were high at the beginning of the season (61 cents per lb. for the fly crop) but the price for the main crop settled at between 39 and 43 cents per lb. in the main producing areas. In the Southern Province, the collection of market cess at the point of export instead of at the primary markets appeared to be working well and bringing in more revenue than the old method.

A processing plant was set up at Mahurunga (Mtwara District), and in Dar es Salaam there are now two plants in operation.

Cassava and Sweet Potatoes

These are valuable food crops in most parts of the Territory and are useful cash crops in the vicinity of the bigger centres of population. Cassava is a valuable cash crop in the districts of Newala, Ukerewe, Kigoma and Manyoni. The prices were very low in 1960 but the amount marketed rose from 27,192 tons in 1959 to 29,659 tons in 1960, worth about £244,687 to the grower. In Newala the price dropped from 20–24 cents per kilo in 1959 to 9–12 cents in 1960 and many growers refused to lift their crop.

With the withdrawal of local rules insisting on cassava planting as a famine reserve, stocks became dangerously low in many districts. Agricultural Department staff continued to encourage the planting of mosaic-resistant varieties, particularly in Tanga Province.

Coconuts, Copra and Coir

Copra production suffered a setback due to several factors, the drop in price, shortage of rain, competition with the whole-nut and coir trade (which prefers unripe nuts), labour difficulties and theft. Production is estimated at 9,544 tons, worth £486,744. The average price per ton was £51 but prices fluctuated considerably.

With a few notable exceptions, mainly in Mafia, growers paid little attention to culture, crop sanitation or to the preparation of a good quality product, as the trade did not demand it.

There was an increasing interest in coir production, particularly in Tanga and Pangani. The price of fibre was about £43 per ton and about 2,589 tons were produced.

The whole-nut trade continued to increase.

Agricultural Department staff continued to try to improve cultural methods and copra quality. Small nurseries of selected nuts were maintained in several coastal areas and there was some response to the encouragement of improving cattle grazing among the coconut plantations near Tanga.

Maize, Sorghum and Millets

(a) Maize

Crops were good in the main growing areas of Moshi, Arusha, Iringa and North Mara, and fairly good elsewhere. Growers, however, were extremely disappointed in the prices offered and withheld much of the production from the markets. Only Shs. 17/- - 22/- per bag was offered, (i.e. 8 to 10 cents per lb.) as compared with Shs. 24/- - Shs. 27/50 in 1959. In all 77,946 tons were sold, valued at £857,406 to the grower, as compared with 70,154 tons worth £982,150 in 1959. The crop was generally free from pests and diseases but stalk borer is general and causes a heavy overall loss; dusting is becoming more popular. Seed of Katumbili was bulked by the Department for distribution and attempts are being made to select or breed a short-term variety suitable for the drier areas of the Territory.

(b) Sorghum

The crop was (generally) fair to good except in places where it suffered from waterlogging or *Striga*. The price was generally low though there are locally good markets for beer making. It is decreasing in popularity as a food; maize, rice and wheat are taking its place.

(c) Bulrush Millet

Bulrush millet (*Pennisetum typhoideum*) was grown widely in Lake and Central Provinces and other places especially where *Striga* was rife. It suffered in 1960 from waterlogging and smut, and yields were low.

(d) Finger Millet

Finger millet (Eleusine) is grown extensively for food and beer, and is a useful cash crop in North Mara, Musoma and Ufipa, although in 1960 the prices were not attractive enough for maximum sales. It is estimated that total production marketed was 12,800 tons at about £12 per ton.

Oil Seeds

(a) Castor

There was a revival of interest in this crop due to the improvement in prices. The total production was 10,925 tons as compared with 6,194 tons in 1959. The price to growers was between 38 and 50 cents per lb. (30-32 cents in 1959) and the total value to the grower about £442,462 (£238,530 in 1959). Castor is still largely a back-yard crop; there are few large fields and little interest among estate owners. *Helopeltis* remains a very destructive pest, and decortication remains a problem though the Tanganyika Agricultural Machinery Testing Unit has produced a successful prototype machine.

(b) *Groundnuts*

The crop was good in the main producing areas in Central and Western Provinces, although the early stoppage of the rains had a deleterious effect. In Lake Province this once important crop is now largely ousted by cotton. 22,852 tons were sold in the markets at an average price of about 50 cents per lb. and the value of the marketed crop was £1,074,044; comparable figures in 1959 were 15,927 tons worth £732,650.

Attempts to improve quality have so far proved unavailing despite support for the Department's efforts by the Dar es Salaam Produce Exchange. Prices were better than last year; a premium was paid for Bukene-type nuts and "Dodoma Bold" but the Mwitunde, which is being encouraged because of its mosaic resistance, is not popular with the trade. Discounts were imposed on machine-shelled nuts.

(c) *Sesame*

Sesame continued to increase in popularity, particularly in Southern Province, partly due to the success of the "Morada" variety introduced by the Agricultural Department. 9,482 tons were marketed at an average price of 42 cents per lb.; a total value to the growers of £445,654. Comparable figures in 1959 were 10,160 tons, 45 cents and £508,000. Southern Province produced 7,290 tons. Flea beetle remained the chief insect pest, but farmers have begun to use insecticidal dusts in the main growing areas. Sesame is of minor but increasing importance in parts of Eastern, Lake and Western Provinces.

(d) *Sunflower*

7,314 tons were marketed worth about £102,396 to the growers. In 1959 the figures were 4,735 tons, worth £141,500. As forecast in the 1959 report, the increase in price in 1959 led to an increase in acreage and production in 1960. However, the price declined again during the season (and it is unlikely that interest in this crop will be maintained, unless prices become more attractive and stable).

(e) *Mafura nut (Trichilia emetica)*

This oil nut is harvested mainly in Tukuyu for sale to a local soap factory. 167 tons were marketed as compared with 340 tons in 1959.

Paddy

The heavy rains in most areas encouraged increased planting of paddy and crops were good generally, though there were poorer crops due to severe flooding in the Rufiji and shortage of rain and irrigation water in Tanga.

Marketing figures, however, do not reflect the high production as many farmers, disgusted by the very low prices at the beginning of the season, consumed the crop themselves. The price increased as the season advanced, from about 14 cents per lb. to about 24 cents. 34,859 tons were marketed, worth £714,609 to the growers, an average price of 18 cents per lb. In 1959 the figures were 30,362 tons, £680,000 and 20 cents per lb.

The Agricultural Department continued to supply improved seed where there was demand. Small premiums are paid for pure samples of Kahogo, Demarara Creole and Afaa varieties, but much of the crop is mixed, making the milling of high quality rice impossible. There is an increase in small paddy hullers in Tanga Province and elsewhere.

Pulses

Pulses of many kinds are grown in Tanganyika, mainly as food for the farmer himself, but also for sale of the surplus as a cash crop. Their production is being encouraged to improve the diet of the local people, but chickpea, soya and white haricot beans are grown almost entirely for sale.

In general, the season was favourable for pulses and good crops were obtained of the early planted varieties. Chickpea, which is grown after the rains in Lake Province, was a failure due to the early cessation of the rains and only about 500 tons were marketed at 28-31 cents per lb. as compared with 2,140 tons in 1959. Mixed beans are very widely grown, particularly in West Lake, but prices were low, (10-14 cents per lb.). A good market exists in Northern Rhodesia for the Southern Highlands bean crop. Cowpeas and pigeon pea did well generally and form a useful cash crop, for example in Tunduru. White

haricot production in Arusha was small but there are signs of a revival. A black-seeded, semi-dwarf bean in Arusha is proving popular in America. Soya bean growing is still largely confined to the Tanganyika Agricultural Corporation farmers at Nachingwea but small amounts are grown elsewhere, for example, in Bukoba where the co-operative societies are organizing the marketing. Bambarra nuts are widely grown in Bukoba and elsewhere, but mostly consumed locally. Field peas have done well in Mbulu but there is a reduction in the crop from the Southern Highlands Province.

Bean fly and flea beetle did serious damage locally.

Pyrethrum

Pyrethrum is grown commercially only in Southern Highlands Province and Northern Province, although trial plots have shown that it can grow in highland areas elsewhere. A feature of the year was the remarkable increase in acreage of African grown pyrethrum in both provinces, the acreage in Northern Province increased sevenfold. The total production for the year 1960 amounted to about 1,010 tons of which about 457 tons came from Southern Highlands Province and 553 from Northern. The pyrethrin content varied from 1.24 to 1.41 per cent and the price was about Shs. 3/- per lb. of dried flowers, depending on the pyrethrin content.

There was a big demand for planting material and seed with which the Department has assisted. Splits from high-yielding clones were obtained from Kenya through Messrs. Mitchell Cotts. Cultivation is generally good. Planting is increasing in Mbeya, Rungwe and Iringa as well as the main areas of Njombe. In the Northern Province the total African grown acreage increased sevenfold to 450 acres since 1959. Growers have appreciated the need of complete weeding and of soil conservation. With the co-operation of the Forest Department, pyrethrum has been planted in the Kilinga Glade in Meru and in Wasendo Glade on Kilimanjaro. These will later be forested and if the scheme is a success it is planned to utilize other glades in this way.

Insects have given concern in certain areas, thrips, cockchafer grubs, eelworm, root-rot and crown-rot have taken their toll where treatment was not timely and sufficient.

Licensing of acreage and marketing is under the jurisdiction of the Pyrethrum Board. All the pyrethrum was sold through co-operatives or individually to the East African Extract Corporation Factory in Nairobi, under contract. This company is to put up an extract plant in Arusha.

Seed Beans and Seed Peas

(a) Seed Beans

The 1959/60 crop of seed beans in Northern Province was a record, 5,000 tons being exported, as compared with 3,888 tons in 1958/59. In 1960, 36,900 acres were registered as planted, 9,000 acres more than in 1959 and yields were reported as average. The development of African sub-contractors in this industry has continued and they planted about 5,000 acres of the total, with very variable standards of production.

Aerial spraying was done against bollworm but the change in insecticide was not a success. Halo blight was common, but Anthracnose and "Oily Pod" were of little importance.

The voluntary certification scheme operated by the Plant Pathologist, Tengeru, and an Agricultural Officer was successful and most of the seed issued was certified as to germination and freedom from Anthracnose. Monoculture of seed beans on some farms is causing increasing erosion and decreasing yields. Seed bean growing is developing near Mbeya.

(b) Seed Peas

The initiative of a farmer in Iringa has resulted in the development of a thriving industry which is being encouraged. Production is now 260 tons and it is difficult to provide qualified staff to supervise inspection and roguing. The general level of cultivation is good and growers take considerable care in achieving the desired standard of quality.

Sugar

The total production of white sugar is assessed at 28,624 tons, as compared with 27,641 tons in 1959. The bulk of the production came from the Tanganyika Planting Co. estate near Moshi, where about 7,000 acres produce 25,587 tons of sugar. Production in this and the Arusha estate is probably near its limit unless more irrigation water is made available.

The Kilombero Sugar Company is making rapid progress in land clearing and preparation for big-scale planting. 240 acres of seedcane have been planted and plans are made for planting 2,000 acres in 1961. Several small estates nearby hope to supply cane to the Kilombero factory when it starts production in 1962. The Mtibwa estate at Turiani (Morogoro) has had difficulty with its factory, and is temporarily operating on a reduced scale. The estate in the Ruvu Valley has now 500 acres under cane and the factory is being constructed.

The estate in Kagera (Bukoba) has 2,700 acres under cane and produced 1,661 tons of sugar, as compared with 675 tons in 1959. Improved machinery in the factory and an area of overhead irrigation have helped to boost production.

There are several small estates mainly in Eastern and Tanga Provinces producing jaggery, which is largely sold to estate labour and to the Wagogo. The price has dropped from 42 cents to 32 cents per lb.

Tea

Tea estate development continues in the Usambaras, Tukuyu and Mufindi, both with increase in existing estates and the opening of new estates.

Total production of made tea was 8,205,514 lb. valued at £1,333,386, compared with 8,154,534 lb. worth just over £1,000,000 in 1959.

In the Usambaras, the crop suffered from severe drought in the early part of the year and the crop of about 3,000,000 lb. was below expectation. In Southern Highlands Province the early good rains produced a very good flush but the bushes suffered from the long dry season. The crop was about 5,003,750 lb. a slight decrease on 1959. In Njombe, the estates at Uwemba and Lupembe continue to increase but are not yet in production. There are now 15 factories in production and 3 in course of construction.

The outstanding feature of the year has been the incipient development of African grown tea which is being given active encouragement by the Agricultural Department and the Tea Board. At Lupembe an Increased Productivity Scheme is under way as described in Section V. In the Usambaras plans are being made to encourage orderly development of African tea in place of the present haphazard distribution of stumps to peasant growers. In Bukoba it is planned to develop African grown tea centred on a factory at Maruku. Nurseries were prepared and seed bearers rehabilitated in several areas in expectation of this development.

Tobacco

The tobacco growers had a difficult season for a variety of reasons, adverse weather reduced yields in several areas, labour strikes threatened to cripple the flue-cured industry, the Nyamirembe fire-cured crop suffered heavily from competition with the coil trade and a severe attack of tobacco beetle. On the credit side, the buyers expressed great satisfaction with the Songea fire-cured crop and Turkish tobacco promises to be a very useful peasant cash crop in certain areas.

Production figures and values are:—

				1960		1959	
				lb.	£	lb.	£
Flue cured	...	...	...	3,970,536	524,730	4,769,968	610,000
Fire cured	...	...	...	1,097,600	34,799	1,350,720	33,324
Turkish	...	...	...	14,800	1,480	trials only	

(a) Flue Cured

In Iringa the planters improved their seed-bed management and cultivation and this helped to offset a difficult season though reaping and curing could still be improved greatly. The planters took considerable interest in the work being done for their benefit at Seatondale Farm, which is now financed partly by the Southern Highlands Non-Native Tobacco Board and is managed by Agricultural Department staff. A survey by the Nematologist of East African Agriculture and Forestry Research Organization showed that much of the Iringa tobacco land is infested with eelworm and the planters must use rotation and fumigants to combat the pest.

The crop amounted to just under three million pounds of leaf delivered to the Union factory. It was decided, after discussions with the East African Tobacco Co. and the brokers, to retain the present grading standards. Indications are that the planters are reducing acreage to produce the crop which the East African Tobacco Co. guarantees to buy and are not aspiring to overseas markets.

At Lupatingatinga in Chunya, the Tanganyika Agricultural Corporation Tenant Scheme had a difficult year and the crop from the farm and four tenants amounted to only 52,000 lb. of mediocre quality leaf. However, six more tenants were accepted and are building their barns.

In the Western Province, the Tanganyika Agricultural Corporation tenants at Urambo produced a good quality crop of over 1,000,000 lb. of cured leaf at an average price of Shs. 3/20 per lb. Unfortunately several of the estate owners left because of increasing labour troubles and costs and there are insufficient small growers to take their place. Early planting proved very beneficial and the planters are co-operating in enforcing a close season and destruction of residues as a control against diseases.

In the Tumbi/Lulanguru area, the growers in the master growers and green leaf growers scheme run in association with Messrs. East African Tobacco, sold over 100,000 lb. of cured leaf at an average price of Shs. 3/05 per lb. and 617,603 lb. of green leaf at an average price of 9.6 cents per lb. The average cash return to the master grower was Shs. 2,006/- per acre. It is planned to have all the growers curing their own leaf in future, as the green leaf growers got an average of Shs. 336/- only per acre.

(b) *Fire Cured*

The Songea season started very well and there were hopes of doubling last year's production. Prolonged rains, followed by leaf curl and fungal diseases, reduced yields heavily from an estimated 700 tons to 467 tons, worth about £32,527 to the growers, as compared with 511 tons worth £24,610 in 1959. Field grading has improved greatly and the high quality has brought favourable comments from the buyers.

The Nyamirembe Tobacco Board operating in Western and West Lake Provinces again worked at a loss, due to a declining crop, competition with coil and the expense of fumigating the bought leaf against tobacco beetle (*Lasioderma*). In order to reduce the infestation, the local authorities passed a resolution requiring the growers to destroy old stocks and trash tobacco in their houses and barns. The crop bought was 23 tons, worth £2,272 to the growers, as compared with 92 tons, worth £8,714 in 1959.

(c) *Coil*

Tobacco is grown for coil in many parts of Tanganyika but most is consumed locally or bartered, so that no production figures are available. In the Nyamirembe area it is a serious rival to the leaf trade as the returns are often higher than for top-grade leaf. Prices ranged from Sh. 1/- to Shs. 8/- per lb. with an average of Shs. 2/-. The main markets are in Ruanda Urundi, Bukoba and down the Central Line. The high price, no grading, and acceptance of infested material make the coil trade very attractive.

(d) *Turkish*

The trials in 1959 showed that good Turkish tobacco could be grown in several areas, but for ease of supervision and marketing, commercial growing was confined to certain areas of Southern Highlands Province. There were several failures due to lack of experience of the crop but, on the whole, the crop was reasonably well grown and the difficult reaping and processing for market fairly well done.

A buyer from Southern Rhodesia bought the whole crop of 14,000 lb. at an average price of Shs. 2/- per lb. There is a great interest among growers in this crop and the area planted will be increased, concentrating on the present areas in Southern Highlands Province, Tabora, Kahama and Manyoni.

Wattle

The Tanganyika Wattle Co. has completed its first full year of production. 6,115 tons of high quality extract has been exported. Unfortunately the price of wattle had fallen during the year from £51 to £41 per ton f.o.b. The Ubena Wattle Scheme had 10,600 acres planted but, owing to the depressed prices and increased labour costs, little if any more was planted. The company accepted small quantities of bark from local authority and individual plantations. In the Usambaras, the factory has been increased but the fall in extract prices has led to a fall in the price of bark. Wattle bark is also produced in small quantities in Moshi and Pare Districts.

Wheat

The total production was 11,660 tons, worth £320,650 to the growers, as compared with 7,276 tons, worth £211,000 in 1959.

The Northern Province crop was a record one of 11,397 tons. For the second time only Northern Province has exported wheat, 3,000 tons of soft wheat going to Kenya to relieve the overstrained storage facilities. At the same time, some hard wheat had to be imported to produce a good bread flour. The bumper crop is the result of several factors, the success of two newly released varieties, comparative freedom from rust, an almost ideal season and the great measure of control of *Quelea*. There was a further increase of production on African farms, much of it produced by non-African renters. Unfortunately the rust resistance of the high yielding new strains is already breaking down.

Wheat is grown in small quantities in other provinces and there is an increasing consumption among the African population. In Songea the production rose to about 400 tons, though the price fell from 34 cents to 30 cents per lb. In Southern Highlands Province production fell and the bulk was consumed locally. Small quantities are produced in Ufipa for local consumption. Stem rust, bird attack and difficulties in harvesting and marketing limit peasant production.

SECTION IV

MINOR CROPS

With its wide range of conditions of rainfall, temperature and altitude, Tanganyika produces a great variety of crops. Many of these are of minor importance and remain in this section until they graduate into Section III or become too small to mention.

(a) *Barley*

Farmers in Northern Province, who grew barley for malting or for pig-feed lost confidence in these markets and very little barley was grown. Production will increase only if definite markets are revived. Production both in Northern Province and Southern Highlands Province was very small and most of it was home consumed.

(b) *Betel Nuts*

The production is based on the Pangani River; 140 tons were marketed.

(c) *Chillies*

Chillies are grown largely in Northern Province under irrigation, but the market is fluctuating and the chillies are readily attacked by a virus which distorts the leaves and growing points and drastically reduces yields. Virus-resistant varieties are being sought.

(d) *Cocoa*

The season has been rather severe for cocoa in Tanga Province, but good progress has been made in the nurseries, and seedlings have been distributed to selected growers for trial in the area considered most suitable. Where maintenance is good, the seedlings have grown well but it is obvious that special care must be given to this crop if it is to develop satisfactorily. There are approximately 25,000 seedlings in nurseries ready for distribution in 1961. Trials are in hand to find the best cultural methods for cocoa in the area. Trials are also being made in the Uluguru, Nguru, Kilombero and Tukuyu areas on the suitability of cocoa as a peasant cash crop.

(e) *Essential Oils*

One estate in Tanga produced 9,500 lb. of bitter orange oil, valued at £7,100. An estate in Uwemba produces geranium and eucalyptus oils.

(f) *European Potatoes*

European potatoes are grown in many hill areas in Southern Highlands, Usambaras and Northern Province. Their use as a food crop among the peasant farmers is increasing. Quality is too low for export, but there is a thriving local trade and at least 1,500 tons were sold from the Southern Highlands Province, and probably a similar amount elsewhere. The blight-resistant "Dutch Robijn" is being distributed, but several markets prefer a white potato and other blight-resistant varieties are being sought. The Northern Province crop marketed this year (1,000 tons) is a reduction on last year due to unfavourable weather. Prices were about £20 per ton.

(g) *Fruits*

With the increasing wealth of the people and the improvement in communications, the internal trade in fruit is assuming ever-increasing importance. It is impossible to estimate the value of this trade with any degree of accuracy, but it must be worth at least £200,000 to the growers.

Bananas

Bananas form an important article of diet in many areas and a cash crop in Moshi, Bukoba, Kigoma, Rungwe and Ukerewe. It is impossible to estimate the total amount sold out of the districts, but it is known to exceed 6,000 tons. In good years bananas form an important export from Bukoba. In 1960, 475 tons, worth £10,640 were known to be exported. Approximately 1,500 tons were exported from Ukerewe Island to Sukumaland. Bananas are a valuable cash crop in Kilimanjaro and Meru, 1,000 tons being the estimated export from Moshi alone. Bananas are increasing in importance in Tanga, in association with coffee and as an irrigated crop. It is estimated that 2,000 tons worth about £40,000 to the grower, were sold from this Province in 1960. Banana weevil caused serious damage locally, but banana wilt was not troublesome.

Citrus

Citrus is an important cash crop in Kisarawe for the Dar es Salaam market, Ukerewe for the Mwanza market and Muheza for the Tanga and Mombasa markets. The total crop sold is impossible to assess, but at least 6,000 tons were sold from these three areas. Citrus planting material was available at Kireka nursery, Morogoro, the Sisal Research Station at Mlingano and Native Authority nurseries in various parts of the territory, where Agricultural Department staff supervised the work.

The lime-juice factory at Mahurunga (Mtwara) is being built, and the people are planting limes in the neighbourhood though the maintenance is not always good. The estate planting at Mahurunga covers 80 acres.

Mangoes are widely grown. The Tabora mangoes reach a widespread market but mangoes have a short season and most are consumed locally. Tinned mangoes, gross weight 142,392 lb. were produced by Tanganyika Packers to the value of £8,200.

Pineapples are widely grown near Dar es Salaam and Tanga.

Plums and other temperate fruits are produced in the Southern Highlands Province, the Usambaras and in other hill areas and find a ready market in the towns.

(h) *Gums*

Gum arabic collecting has been fairly active in Central Province, but less so in Western and Lake Provinces, where the main cash crops have been better. It is estimated that 1,440 tons were sold. Gum copal is collected in small quantities in coastal districts.

(i) *Kapok*

The marketed crop was again small as the price of 10–20 cents per lb. was not considered economic. Only 986 tons were marketed.

(j) *Kenaf (Hibiscus fibre)*

This crop is still in the experimental stages and further trials are to be done in Northern Province and Lumemo (Ifakara) before it can be recommended as a suitable cash crop. The mechanization trials in Arusha have shown that planting and harvesting can be mechanized and have proved that the ribboning machine can do successful work, but there are still difficulties to be overcome in retting. There are indications that kenaf may not be attractive to Northern Province peasant growers, as it involves more work than the existing cash crops for the return received.

(k) *Onions and Garlic*

Onions are becoming more and more popular as a food and a cash crop and the Agricultural Department has assisted with seed supplies and advice, including a pamphlet prepared by a Field Officer in Moshi. It is estimated that 8,058 tons were sold at an average price of 30 cents per lb. The Northern Province is the main producer and the growers there are improving their cultural practices, including the use of sulphate of ammonia.

Agricultural Department staff are attempting to improve the quality of locally produced seed. Thrips did severe damage, though they can be controlled with D.D.T. sprays. Onions are grown in favoured localities in all provinces and are proving to be a very useful crop on irrigation schemes. Garlic is becoming a popular crop in Mbulu, having increased from 3 tons marketed in 1959 to 15 tons in 1960.

(l) *Palm Oil and Palm Kernels*

Kigoma is the main producer though there are estates and small plots in Tanga and elsewhere. Attempts to popularize it as a peasant crop and improve cultural practices were not successful.

Production was about 95 tons of oil and 761 tons of kernels.

(m) *Papain*

Prices fell from Shs. 32/- to Shs. 8/- and then rose to 14/- per lb. in the past two years and several small estates went out of production. Production in Northern Province continues and some growers have favourable contracts in America for good quality papain. The Agricultural Department is assisting growers to produce good quality by improving the design of the typical grain drier.

(n) *Rubber*

Interest is being taken by two rubber companies in the possibilities of rubber growing in the Kiberege/Kilombero area and the Land Planning Officer established that land which may be suitable is available for at least one estate. The existing estate at Sanje continues to give profitable returns but the trees are near the end of their economic life.

(o) *Spices*

Black pepper is produced in Tanga Province and the estimated production was over 10 tons. Cardamoms are increasing in the eastern Usambaras and are being encouraged as a useful soil conserving crop. Cloves are grown in a small way in the Usambaras and Ulugurus.

(p) *Vegetables*

Vegetable growing is on a big scale in the Ulugurus (565 tons), Usambaras (809 tons) and Southern Highlands (540 tons).

Vegetable growing is being actively fostered in Moshi and Arusha by the provision of vegetable seedlings which are in great demand, and by advisory pamphlets and talks. Vegetable culture is markedly improving in the Northern, Tanga and Eastern Provinces. The main problems are the periodic gluts and shortages, transport to market and insect pests. Where these problems are overcome, growers find vegetables a very profitable crop.

(q) *Other Crops*

Small quantities of raffia fibre are produced from the Eastern Province coast. About 60 tons of allanblackia nuts were marketed from the Ngurus and Usambaras.

SECTION V

INCREASED PRODUCTIVITY SCHEMES

The 29 Increased Productivity Schemes for which Colonial Development and Welfare assistance was made available in 1957, ceased to exist as separate entities in June, 1960. They varied from complete failures to outstanding successes, and overall they have done much to increase productivity and potential productivity in the territory.

Those which must be accounted as failures are the provision of a mobile workshop for Rufiji ploughing units, increased production in the Ulugurus, improvement of *dagaa* marketing in Kigoma, development of coffee in Musoma and of groundnuts and castor in Manyoni. Several others had limited success, coffee in Mahenge, coffee in the Usambaras and Handeni and mixed farming in the Irangi Expansion area. Two small schemes achieved their object and were discontinued—construction of the pyrethrum driers in Kainam and the distribution of blight-resistant seed potatoes in the Ulugurus (where the bulking will be continued with Local Authority funds).

The remainder were, for the most part, successful, and the progress reported in 1959 continued in 1960. However the expected increase in Songea tobacco did not materialize, due to unfavourable weather, but the foundations were laid for improvement in quantity and quality in the future. Preparation of seedbeds and field grading are now very good but crop cultivation and curing must still be improved.

In the coffee schemes, very good progress was made, though the emphasis is now more on Arabica than on Robusta as a result of the low prices now being paid for Robusta. North Mara Arabica continues to develop satisfactorily and the quality was praised by the Nairobi brokers. A co-operative was formed to buy the crop from 1961 onwards. Coffee nurseries in Arusha provided good seedlings for the developing industry and a good start was made in coffee production in Gorowa. The Pare Arabica scheme has made fair progress but is not to be increased much further. The Arabica scheme in Kasulu/Kigoma made good progress, the people continued to be enthusiastic and the Local Council financed communal pulperies. The Kibondo Arabica scheme made slower progress. The small scheme for Arabica development in the Wazi Highlands of Kondoa was successful. In the Matengos of Songea, progress was maintained in improving coffee culture and increasing production. A central pulpery and several small factories are being constructed with advice from Agricultural Department staff. In Rungwe, the target of 2,000 tons of clean coffee was achieved three years ahead of schedule and a target of 4,000 tons was set for the end of 1963. In the Njombe and Mbeya coffee schemes, progress was not so spectacular, but there were definite improvements, notably in the preparation of coffee for marketing in Mbozi.

The highly successful inland fisheries scheme which increased production so markedly in Central Province was extended to Western and Northern Provinces. The development schemes in Handeni made considerable progress in well digging, road making and encouragement of production. The ox-training work in Central Province which "caught on" only in Mpwapwa and Iramba, showed signs of progress in Dodoma and Manyoni.

The Njombe pyrethrum scheme, started in 1957, has proved very successful, and by the end of 1960 there were 2,599 acres established. During the year three more growers' associations were registered and 65 acres of nursery were planted—sufficient for an additional 2,225 acres of pyrethrum.

Seven new Colonial Development and Welfare productivity schemes were approved to begin in 1960 and good progress is being made.

- (1) *Cocoa*.—This is based on a few areas believed to be suitable in Tanga, Morogoro and Tukuyu. Preliminary trials, a soil survey and establishment of nurseries paved the way to future development. Cocoa under irrigation is being tried in Pare. Difficulties in establishment and losses from pests were met, but prospects seem favourable for cocoa production in a few limited areas.
- (2) *Seed Peas*.—This is the development of a scheme begun two years ago by a farmer near Iringa. Seed from Europe is given out to peasant growers, cultivation is under inspection, the field rogued and the once-grown seed bought back after careful selection. The first year's target of 150 tons was easily surpassed (260 tons) and prospects are good.
- (3) *Turkish Tobacco*.—Trials showed that Turkish tobacco could grow well in certain parts of Tanganyika. In order to cash-in on a good market, it was decided to go ahead with a "crash" programme of development in Southern Highlands Province, followed by Central Province and Western Province. Despite numerous "teething troubles" results were promising enough to encourage further production in 1961. 12,784 lb. of leaf were produced mostly from Iringa, and the average price was Shs. 2/- per lb.
- (4) *Tea Development*.—At Lwembe in Njombe District tea growing by peasants is being encouraged. They will produce fresh leaf for the nearby company factory until such time as they are growing enough to justify a co-operative factory. A nursery site was cleared and a survey of the potential tea growing area made. In order to start production earlier, the company agreed to sell stumps from Tukuyu.
- (5) *The improvement of irrigation (Arusha)*.—It was decided that the first step was to make a survey of the present situation in the Nduruma River and its furrows. This was virtually completed by the end of the year.

- (6) *Stock Holding Ground, Ilonga*.—This was planned to assist in the movement of stock from Central to Southern Province. Work was delayed till the end of the year when staff was made available.
- (7) *Kenaf*.—It was decided to defer encouragement of commercial growing until further experiments were done on growing and processing the crop and more information obtained on the economics of production.

Agricultural Department staff gave considerable assistance to the Social Development Department in their efforts to discover effective extension methods to improve cotton cultivation, especially in the use of insecticides, in Eastern Province.

SECTION VI

VERMIN AND GENERAL PESTS

Khapra Beetle. (Trogoderma granarium). The Produce Inspection service is now fully organized in Dar es Salaam and Tanga. During the year 110 ships were inspected for khapra beetle and in 58 fumigation of part of the cargo ordered. Regular inspections are carried out in godowns, and in Port buildings. Treatment was ordered whenever *Trogoderma* was found. Agricultural staff in all provinces were trained and equipped to deal with *Trogoderma* attack before it became widespread. The trained staff made thorough surveys of grain stores and shops throughout the territory. The value of this survey was proved when *Trogoderma* was found in places as widely dispersed as Dodoma, Korogwe, Songea and Masasi. These infestations were promptly dealt with, either by Agricultural Department staff or by the fumigation company, and, so far as can be ascertained, were destroyed completely. Unfortunately, several traders objected to the expense of the treatment and have not co-operated in this work, not appreciating the heavy losses that would be incurred if *Trogoderma* became established in the country.

Sudan Dioc. (Quelea).—The highly successful campaign against the Dioc was continued this year in close co-operation with the Kenya Agricultural Department and with the full support of the farmers. It is estimated that 85,000,000 birds were killed in the Northern and Central Provinces, mainly through the destruction of nesting colonies totalling 1,210 acres in extent, out of an estimated total area of 1,350 acres. 820 acres were destroyed by aerial spraying, 290 acres by flame throwers and 100 acres by action of the local people. The provision of Colonial Development & Welfare funds to increase this service made it possible to attack at once every colony reported. The season was very favourable to rapid breeding of birds and yet there was very little damage done to wheat and this campaign contributed greatly to the bumper wheat crop. The Zoologist continued his investigation of breeding and migration. Ringing has indicated that the dispersal is from the Central Province north into Northern Province and Kenya and north-west into eastern Lake Province.

Sudan Dioc and other grain-eating birds are reported in the drier areas of other provinces but are never so numerous nor so destructive as in Northern and Central Provinces.

Rats and Otters.—In Songea the Zoologist is investigating methods of control of the giant rats (*Cricetomys gambianus*), which devour coffee, and the otters (*Aonyx capensis*), which destroy fish in the stewponds which are now very common in the district. As the rats are used for human food, poison cannot be used and snaring or trapping will be necessary. The rat plague in parts of Eastern Province was particularly severe, sufficient to cause food shortage and serious damage to cotton in Morogoro and Kisarawe.

Pigs, Porcupine and Baboon.—The Vermin Control Service in Lake Province continued its highly successful and appreciated work under the direction of the Agricultural Department and paid for by the Lint and Seed Marketing Board. Elsewhere, these pests are destroyed in a more desultory way by poison, rewards for tails, communal hunts and local authority vermin guards. In many districts the Field Officer assists in organizing this work. Elephant and hippo do severe local damage to crops and the services of the Game Department in driving the elephant away from cultivated areas are greatly appreciated by the people. Moles are locally troublesome and the Agricultural Department keep stocks of cartridges for their destruction.

Prickly Pear.—The local people are now giving more support to the campaign against prickly pear in East Lake by spreading the scale *Dactylopius tomentosus* and by burning the clumps of the weed.

Water Hyacinth. (Eichornia crassipes).—The spraying of the Pangani and Sigi rivers was repeated this year at least twice, using M.C.P.A. weed killer. The rapid regeneration from a single plant makes it necessary to spray annually as the spraying teams can never kill every single plant in such an intricate river system.

Locusts.—Thanks to the constant vigilance and prompt action of the control organizations, no locust swarms invaded Tanganyika. Provided the organizations remain in action, there should be no danger of red locust or migratory locust, but the desert locust remains an ever-present threat.

Other pests and diseases affecting specific crops are mentioned under the crop.

The Produce Inspector, Dar es Salaam, issued 220 Plant Importation Permits and 80 phytosanitary certificates and phytopathological certificates, and also inspected infested foodstuffs on behalf of Lloyds and shipping companies. He also assisted in the confiscation of prohibited imports such as second-hand gunny bags and flowers, fruit and seed.

SECTION VII

LAND PLANNING, SOIL AND WATER CONSERVATION AND LAND USAGE SCHEMES

There are three Land Planning Units under the control of Land Planning Officers at Tengeru, Iringa and Ukiriguru. The Land Planning Training Centre at Morogoro is supervised by the Land Utilization Officer. The mechanical services unit at Iringa closed in December, due to insufficient demand, but the unit at Tengeru continues its soil and water conservation work.

Northern Region Land Planning Unit

The detailed survey of the Ardai-Makuyuni (Arusha) settlement area was completed and assistance given in demarcating holdings. Reconnaissance surveys and settlement planning were done in Kitete and Madege in Northern Province and at Chubi-Maweni in Kondo District of Central Province. Reconnaissance surveys of irrigation areas were initiated at Chimaligo (Mpwapa) the Bubudodoma Valley and Gonja (Same). Three estates, Sanya, Themj and Ubiri, were surveyed for division into smaller units on a proper land planning basis, and six other estates surveyed.

Central Region Land Planning Unit

The Unit continued a heavy programme of land planning work. The irrigation areas in Chimala, Kalenga and lower Lukosi valley were investigated and reported on. The Agricultural Officer (Land Planning) Iringa, and the Land Utilization Officer, with their staff, did a rushed but thorough survey and assessment of the proposed University site at Morogoro. The Unit made a thorough survey of the Lupembe area for tea growing, reconnaissance of potential rubber areas in the Kilombero/Kiberege area, mapped and investigated land in Kiwere for turkish tobacco. The Unit also advised on the improvement of water supplies at Ismani, made a soil conservation plan of Tengeru and advised many farmers in Njombe and Iringa on soil and water conservation.

Western Region Land Planning Unit

The Pasture Research Officer at Ukiriguru supervises the Land Planning Unit in the Western Region and has a Field Officer to assist him in this work. At Ukiriguru Agricultural Training Centre a detailed survey was completed, soil conservation measures planned and their construction nearly completed. A similar survey and plan were completed for the Western Regional Research Centre but the construction of the conservation work is not yet complete. Detailed surveys were done for a Tenant Farming Scheme at Malya, the division into small holdings of Kisinye Sisal Estate (Geita), the Mulebya dam settlement area, the Mkibuga Swamp and a settlement area in Ukerewe and the Mwamina dam in Maswa. A preliminary survey of the area below the Igome Dam, Tabora, was done. Soil conservation works on Ukara Island continued. A survey is being done of the Maruku experimental farm and preliminary work done on the Bwanga substation in Biharamulo.

The Land Planning Training Centre

This centre continued its valuable work of training staff in land planning and farm planning, providing three in-training and promotional courses for Agricultural Department staff, and producing surveys and maps for land planning and other Agricultural Department purposes. Three planned holdings, intensive, semi-intensive and extensive, are being established at Morogoro for teaching purposes.

Mechanical Services

The Mechanical Service in Northern Province had a difficult year. Operations were curtailed, first by frequent breakdowns of the old tractors and equipment, and, when these were replaced and the service working well, by a shortage of orders resulting from a period of lack of confidence among the farmers. Latterly, the orders have poured in and the service was fully employed, but the output and financial return over the year were disappointing. A new scale of charges was introduced in July which brought into the open the 50 per cent subsidy on work connected with soil conservation. In all jobs except conservation terracing, the cost has been covered by the gross charges made. Work included dam making, road-grading, construction of terraces, waterways, diversion ditches and firebreaks.

The Iringa Mechanical Service also had a difficult year and orders for soil conservation work were insufficient to keep the unit busy, so that the officer-in-charge was obliged to take on jobs such as ploughing, road grading and levelling playing fields to supplement the tasks for which the Unit was intended—terracing, construction of diversion ditches and waterways, and similar soil and water conservation works. The equipment is mainly worn and much time was lost in repair work. The survey team surveyed five dam sites, eight farms, and assisted in the Lupembe tea area survey. The service was disbanded in December and the useful equipment transferred to other sections of the Department.

Farm Planning

The Agricultural Officer, Farms and Estates, and his staff in Northern Province work in close co-operation with the Mechanical Services. Their services continue to be in demand. Farmers were assisted in planning their farms according to the best land usage and the labour and finance available. Planning includes mapping the farm, laying it out for soil and water conservation, siting buildings, roads, dams, field boundaries and irrigation channels. The Agricultural Officer has also investigated the problems of erosion in coffee estates and of provision of mulch. In other provinces a few farmers have shown interest in having their farms mapped for planning purposes, but it is suspected that some intend to use this map as a proof of ownership (which it is not) rather than a genuine desire to plan the farm properly. The demand for farm planning, however, is bound to increase and staff are being trained to meet this demand.

Settlement Schemes

Agricultural Department staff played its part in the planning and supervision of settlement schemes in various parts of the territory. Assistance was given in land planning at the two settlement schemes, sponsored by the Tanganyika African National Union at Sonjo and Ichonde near Kiberege, and, latterly, assistance was also provided for the supervision of the large labour force of unemployed persons from Dar es Salaam who were sent to Sonjo to clear the forest land.

The settlement area at Makuyuni for the Waarusha was ready early in the year, but a breach in the dam delayed the entry of settlers until late in the year, when the breach had been repaired. Boundaries and firebreaks were demarcated, three other areas were or are being land planned for settlement—the Sanya ranching unit No. 15, at Madege near Babati, and near Mbulumbulu.

In Lake Province departmental staff assisted in planning and supervising settlement schemes in Ukerewe Mainland, East Mwanza and Geita.

A small settlement scheme at Tamota (Handeni), is being organized by the Agricultural Department staff.

Soil Conservation

Although the repeal in 1957–58 of Local Authority soil conservation rules resulted in an immediate recession in soil conservation by the peasant farmers, there are encouraging signs in many districts of a revival of this work on a voluntary basis and many officers, e.g., in Sukumaland, report co-operation in their efforts to conserve the land. The conservation works continued in Ukara Island till Local Authority funds ran out. In Ngara, contour banks were repaired by communal turnouts. The Eastern Kilimanjaro contour banking is now almost a standard practice, and, on the lower slopes of the mountain, the newly allocated “kihamba” land is being laid out with some attention to proper land use. On

the other hand, attempts to control cultivation on river banks proved ineffective, but attempt to are being made to confine their use to the planting of bananas and fodder grass. In Arusha work is concentrating on utilization of steep slopes and methods of grassland recovery, but, here is serious erosion on some of the estates, which must be planned and properly conserved. In the Usambaras, active opposition to soil conservation is ceasing and many farmers, notably the vegetable growers, are planting on terraces. Little if any progress can yet be reported from the Ulugurus. The land utilization project in the Pares is making steady progress. A plan to control gully erosion in Buha was dropped by the Local Council after ameliorative work had begun. In Central Province, where soil conservation is a problem of appalling magnitude, the partial control by annual construction of contour banks has virtually ceased, as communal turnouts cannot be enforced.

Water Conservation

Agricultural Department staff organized or assisted Water Development and Irrigation staff to organize water conservation projects in several places, of which the following are examples. A Field Officer undertook a survey with a Forest Department Officer of the Mkundi river catchment as part of an assessment of the needs for the control of destructive floods in the Wami/Magole area: the plan for the farming area itself has not been implemented as it involves the farmers in heavy costs. Field staff in the Lake Province and elsewhere assisted the Water Development and Irrigation Department in preliminary investigations of dam sites and repair of dams.

Work continued satisfactorily on the Mbozi water conservation scheme for protection of springs and streams and the reserving of steep slopes.

SECTION VIII

Irrigation

The Water Development and Irrigation Department is responsible for the construction of dams and the major channels bringing irrigation water to the land. Field irrigation and drainage channels are the responsibility of the Agricultural Department, which also does planning and construction of small irrigation works from streams and other natural waters.

Agricultural Department staff on irrigation research work consist of an Agricultural Officer at Ilonga and a Field Officer on the irrigation experiments and settlement scheme at Ikowa in Central Province. On the extension side, there is a Senior Field Officer in Eastern Province, but irrigation work comes within the duties of all extension officers. The Senior Field Officer inspected irrigation schemes in Eastern Province and suggested improvements and supervised the work done on several. At Mlali (Morogoro) the paddy crop was good and the water distribution well organized by the local committee. The old furrows and water distribution to the former Agricultural Department irrigation scheme at Kilangali (Kilosa) were repaired. At Kalimawe in Tanga Province, leaching of saline soils below the high-level channel continued till the water level in the dam fell too low. 174 people have taken land in this area and are clearing bush and preparing their plots. In Moshi the administrative control of the Uru Chini irrigation scheme was held up pending a decision of the Chagga Council. Good returns were obtained from the existing plots and the plots are used to teach improved methods of water use. The scheme for improving irrigation in the lower areas of Meru is awaiting the completion of a survey of the Nduruma River and its furrows. In Mbulu, irrigation methods have been demonstrated on estates below the Rift wall. In Central Province, the Mang'onyi scheme has 65 tenants, and irrigation farming practices are slowly improving. The local administration has now full control of land and water use in the irrigable area. At Ikowa there are 30 tenants cultivating 50 acres and they have asked for plots for dryland farming to supplement the irrigated crops. There is considerable keenness and practices are improving slowly. Agricultural Department staff is giving considerable assistance in an irrigation scheme at Kalenga near Iringa. There are numerous small irrigated areas in Lake and Western Provinces, producing a very considerable total of crops, mainly rice. The poor prices for paddy have resulted in a loss of interest by the farmers, but Malya paddy crops were again very good. The survey of the irrigable land below Igombe Dam (Tabora) indicates at least 2,000 acres irrigable. At the numerous dams in Unyamwezi, the Agricultural Department staff are assisting in the planning, layout and improvement of small irrigation areas—from only five acres up to about fifty. In some instances the irrigation is controlled by a local committee and an annual water "rate" of Shs. 30/- per acre charged.

SECTION IX

Animal Husbandry

Work on Animal Husbandry, which is the joint responsibility of the Veterinary and Agricultural Departments, made progress in several districts, though the farmers have still very much to learn about the best way to care for stock and integrate them into a mixed farming system.

Work was concentrated on the improvement of grazing and fodder for the cattle, either by controlling the grazing as in North Mara, or by provision of fodder grasses as on Kilimanjaro and Meru, using *Setaria splendida*, glabrous elephant grass and Rhodes grass. Overgrazing and mismanagement of grazing are increasing problems in many areas—Sukumaland, Arusha and Central Province are examples. One of the problems of using animal draft is the insufficient food for the oxen, particularly at the time when the main ploughing is done. In the Lake Province work concentrated on the provision of fodder for this period by the use of elephant grass, Rhodes grass and velvet beans. This campaign was based on Natural Resources centres and middle schools and was most successful in North Maswa.

In certain areas cattle are insufficient for balanced farming or for the supply of meat and milk for the people. The Agricultural Department assisted in the provision of cattle from Central Province to Southern Province, but many of these are slaughtered and the demand for breeding stock and work animals is disappointing. The main movements of cattle for building up breeding stock are from Lake Province to West Lake Province and from Njombe to Songea.

Agricultural Department staff gave advice and assistance in improving the care and protection of cattle and other domestic animals, e.g., by the provision of barbed wire enclosures, better housing, provision of bedding and stall feeding and, of course, the use of cattle manure in the fields. Progress is very slow, but individual farmers are adopting the new ideas and proving their worth, so their example may soon be followed.

In Tanga trials are being done to establish the economics of cattle grazing under coconut groves. In Central Province much of the Department's effort is being diverted from the encouragement of annual crops to the development of animal husbandry, the better use of grazing and the integration of stock with crops.

The Agricultural Department has co-operated with the Veterinary Department in the supervision of seven centres for distribution of improved type cockerels.

SECTION X

Animal Draft and Mechanization

The Tanganyika Agricultural Machinery Testing Unit at Tengeru continued its programme of testing and developing machinery of potential use to Tanganyika farmers. The construction of a wear test rig was begun. Tests were completed on three types of ploughs, a hand seeder, a pyrethrum picker, in the retting of *Hibiscus* fibre, in the Hawkins tropical cultivation equipment, being tested at Oljoro, and in the drying of papain. The Unit is assisting the National Institute of Agricultural Engineering in the development of their ox-drawn equipment. Improvements were made in the accommodation of the Unit, but staff housing is still inadequate. The work on the Hawkins equipment was taken over by Agricultural Officer, Farms and Estates, later in the year.

The use of tractors and tractor-drawn equipment by individual farmers and by contractors is still popular in many areas, though few have made a financial success of the venture and most of the local authority and ploughing society schemes have closed down. In Lake Province, where conditions are suitable, contract ploughing by tractors is going ahead and a count in March revealed 147 tractors in contract ploughing. In the Northern and Tanga Provinces contract tractor ploughing is on the increase but the standard of work is generally poor and rarely followed by further mechanized cultivation and planting. Charges vary considerably, but average about Shs. 40/- per acre for ploughing.

Considerable progress was made in most provinces in the use of oxen and donkeys for ploughing and pulling carts and other farm implements. This is being very actively encouraged by the Agricultural Department and there are training schools for the animals and their drivers at Urambo, Mpwapwa, Iramba, Gairo (Kilosa), Chambezi (Bagamoyo) and elsewhere. In the Lake Province sales of ox-ploughs were very heavy (4,000 in Shinyanga alone) and North Mara has over 15,000 ox-ploughs. Most loan applications from the

African Loan Fund in Lake Province are for oxen and ploughs. The demand for carts, harrows, seeders and other equipment is not so high as for ploughs but is increasing in some areas. In Western Province there are at least 4,000 ox-ploughs in Nzega and 1,000 in Ufipa. As in Lake Province, the problems are that ploughed land is rarely protected against soil erosion and the farmers tend to plough more land than they can cultivate afterwards by hand. The Agricultural Department is fully alive to these dangers and advocates ridging ploughs for contour ploughing, and the growing of crops in rows so that cultivation by ox-drawn equipment can be done. Ox-carts are being strongly encouraged for transport of produce, fuel and manure.

There are increasing sales to farmers of maize mills, coffee pulpers, insecticide and fungicide sprayers, wheelbarrows, threshers and pumps.

SECTION XI

STAFF TRAINING AND AGRICULTURAL EDUCATION

The educational programme for training African staff for more responsible positions was greatly intensified during the year. An Agricultural Officer in Headquarters was appointed to full-time training and education duties. Plans were prepared for the construction of an Agricultural College, the extension of existing training facilities at the Natural Resources School, Tengeru, the Agricultural Training Centre, Ukiriguru, and the Land Planning Training Centre, Morogoro, the construction of nine Farm Institutes and a new Agricultural School and there was also a greatly increased programme for training overseas.

The highest level of staff training required for Agricultural Officers and Specialists, is obtained locally at Makerere University College, but 1960 was the final year when training was available there for men of diploma standard destined for Field Officer rank. Careful plans were therefore drawn up for an Agricultural College in Tanganyika to accept its first students in 1963 and application was made to the Rockefeller Foundation and other organization for funds to help with its construction.

Pre-service training of Field Assistants ceased at the Natural Resources School, Tengeru, and in the final course 18 out of 23 students were successful in the examination and were appointed as Field Assistants in the Department. The new arrangements, whereby prospective recruits to the Department are required to spend at least one year of practical work in the field before entering the Natural Resources School, were put into operation and very quickly resulted in a higher standard of recruit becoming available.

At the Ukiriguru Agricultural Training Centre the one-year simplified course and the two-year course for Subordinate Service Instructors were completed. Enrolments for the next simplified one-year course totalled 35 and for the two-year course 54. All 17 students on the wives' course completed their year successfully and a further 9 were enrolled at the end of the year. The final one-year course for teachers was successfully completed. There was a high percentage of passes but the Principal reports that the academic standards are declining, though behaviour is better than in recent years. Implementation of the farm planning at the school was hampered by boundary disputes and lack of planting material but considerable progress was made.

At the Land Planning Training Centre in Morogoro 15 trainees continued their course leading to appointment as Junior Survey Assistants. The course for students from the Forest Department continued and the Land Planning Training Centre was also used for a Field Assistant in-training course and the Field Assistant promotion course.

In-training courses of many other kinds were conducted during the year. In the Eastern Province all field staff engaged in the cotton areas of Kilosa District were given intensive training at Ilonga and Tengeru prior to the launching of an improved husbandry campaign in association with the Social Development Department. Other courses conducted during the year included farm planning at the Land Planning Training Centre, Turkish tobacco cultivation at Iringa, irrigation in the Central Province, coffee leaf-fall studies at the Coffee Research Station, the cultivation of sisal and animal husbandry at the Sisal Research Station and pyrethrum at Njombe. A large number of short courses were run at district level. Advantage was taken of the Outward Bound School for courses and assessments for Field Assistants.

As in the previous year, expatriate officers joining the Department were given a seven weeks' Swahili background course provided by the Social Development Department and the course was again supplemented by lectures on different aspects of agriculture and related subjects.

There are no facilities for training practising farmers other than by short courses conducted by extension officers in the field. Plans were therefore made during 1960 for the construction of nine Farm Institutes, intended to give short courses to groups of from 20 to 60 farmers. An Extension Consultant of the United States International Co-operation Administration visited the territory to prepare a report and advise whether aid would be given for this project. Provincial sites were selected in each province.

Funds from the bequest of the late Mr. Christos Galanos of Tanga became available to Government and arrangements were made for the appointment of trustees, who will probably arrange to commence construction of an Agricultural School in 1961.

To provide more trained teaching staff for these new institutions, five officers were sent to Moray House College of Education in Scotland for a five-month course in teacher training. These officers will, in the first instance, augment the staff at existing training centres and will later be posted to some of the new educational institutions which are being planned.

Other courses abroad designed to improve the experience and qualifications of senior staff were:—An Experimental Officer completed a post-graduate course in plant breeding at Cambridge and another went to the United Kingdom to take an M.Sc. degree in plant pathology. A Field Officer went to the United States to study for a degree in agriculture. An Agricultural Officer attended an in-training course sponsored by the I.C.A. in the United States on agricultural publicity, education and extension methods. One Field Assistant was sent for diploma training overseas and bursaries were arranged for other officers considered suitable for promotion. A Senior Field Assistant completed three months at the Makerere College Farm and was promoted to Field Officer. Twelve Senior Field Assistants began training leading to the promotion of several of them to Field Officer rank in 1961. Twenty Field Assistants attended an in-training course, which led to the promotion of fifteen of them to Senior Field Assistant.

A major change of policy as regards agricultural work in primary schools was effected during the year. In view of the lower age of entry into such schools, the frequent difficulty in obtaining suitable land and the increasing need for a primary school to concentrate on academic teaching, agricultural training and the use of demonstration plots were abandoned during the year. Officers of the Department continued to give assistance to middle schools and a number of very satisfactory school small-holdings are now established in various parts of the country.

SECTION XII

AGRICULTURAL EXTENSION METHODS

Methods of agricultural extension vary from place to place according to the nature of the problem and the reaction of the people. Officers are encouraged to use their initiative in finding out which methods bring response. In two instances where our methods were not having the desired response, the assistance of the Social Development Department Propaganda Team was requested and it is now working on encouraging the improvement of cotton culture in Eastern Province and better tobacco culture in Kibondo.

In many districts extension work is based on the Natural Resources Centres, which are used in co-operation with the Veterinary Department for the distribution of seed, insecticides and improved tools, for courses and demonstrations of ploughing and better farming practices, for bulking seed and planting material of grasses and other crops and for provision of improved stock and teaching of animal husbandry lessons. These centres are financed by the Local Authority and in several places lack of funds or over-expenditure on other items has reduced the money available for this useful and appreciated service.

In other districts the goodwill and co-operation of the farmers are won by performing a useful service such as organising coffee pruning teams in Ngara and Bukoba or selling tools and insecticides with the use of a local authority revolving fund (Bukoba).

Encouraging reports have been received from most areas of the success of our methods of concentrating on the few responsive farmers in the hope that they will leaven the lump. The field staff are now being regarded as teachers and not policemen and this is symbolized by the replacement of the khaki uniform jacket by white or blue shirts.

Extension equipment, like projectors, flannelgraphs and tape recorders is still very scanty, but several officers have made excellent use of the little material they have.

Methods are changing to keep ahead of the better educated and more sophisticated farmer of today. Instruction pamphlets and posters were issued, sometimes in association with a Commodity Board, to guide and assist the producers. Examples of these are:—

- (1) Farmers' Bulletins on Cashew and Groundnuts (Southern Regional Research Centre.)
- (2) Bulletin on Control of Water Hyacinth (Tanga).
- (3) Bulletin on Onion Production (Moshi).
- (4) Tobacco leaflets (Seatondale).
- (5) Pamphlets on Coffee, Wattle and Cocoa (Tanga).
- (6) Bulletin on Cotton Pest Control (Ilonga).

Fewer agricultural shows were held this year, partly due to the Elections, but Agricultural Department staff assisted at shows at Lushoto, Nzega, and in districts of Southern and Central Provinces. Interest in improved agriculture was stimulated by competitions, for example, for the best cotton field in Kilosa and the best farmer in Lushoto.

Farmers' days and visits to places of agricultural interest were organized in several districts. In some instances these visits resulted in marked improvement in the farmers' methods.

The Assistant Agricultural Officer in Nzega used a system of village courses, which were very successful in teaching improved methods of cotton cultivation.

All staff are urged to "practise what you preach" in their own holdings and gardens, usually with success. In the Southern Province certain Instructors maintain demonstration holdings as a major part of their work. It is a standing instruction that all land under the jurisdiction of the Agricultural Department must be properly conserved and laid out in accordance with the tenets of good land usage. Every effort was made to put this into effect.

In Lushoto a team consisting of a Field Officer (Agriculture), a Field Assistant, a Veterinary Assistant and a Social Development Assistant with the part-time services of a Health Assistant and a Forest Ranger, worked in the Galambo valley with considerable success. The agricultural development as a result includes communal nurseries for onions and citrus, a small coffee pulpery and a slight improvement in standards of husbandry.

Officers of the Agricultural Department were required to inspect many farms and agricultural projects for which agricultural loans were requested. These inspections, although time-consuming and irksome, were put to good purpose in teaching the farmers how the money should best be spent to improve the productivity of their land.

The Agricultural Magazine "*Ukulima wa Kisasa*" (Modern Farming) made great progress. In January the circulation was about 10,000 copies per month and covered only the Lake, West Lake, Eastern and Northern Provinces. Gradually, throughout the year, it became possible to circulate in other provinces until by December the print order had risen to 20,000 and there remained only the Western Province outside the circulation area and this will be included in February, 1961. The system of news gathering was also improved during the year by the introduction of provincial correspondents. These correspondents, fairly senior Field Assistants with a flair for publicity work, are attached to Provincial Agricultural offices and the magazine is thus ensured, not only of a supply of up-to-date news, but of news which appears in no other periodical. The farmer continues to be encouraged to express his views and information is given about the success of fellow farmers. News of farming in other countries receives prominence and from time to time special supplements on particular subjects are published. In 1960 these supplements included Poultry, Fishing, Forestry, Beexwax, and Water Development and Irrigation. Thus, not only Agriculture, but the whole field of Natural Resources, is included in the magazine. *Ukulima wa Kisasa* is the only Swahili farming magazine in East Africa and proof of its ever-growing popularity is the number of postal subscriptions which are coming in from Kenya. It is increasingly supported by advertisers who find its unique circulation into remote rural areas, to the farmer—the man with the money—a most profitable medium; advertising revenue has risen from Shs. 2,000/- to Shs. 4,000/- per month.

Sixty-eight press releases were made to the national press and extension officers continued to contribute to local vernacular papers.

The weekly half-hour radio programme, "*Maarifa ya Ukulima*" (Agricultural Information), continued to be extremely popular and whilst full details of the result of the Wilson Survey on listening habits are not yet available, it was noted that 76 per cent of males between the ages of 24 and 35 express interest in the programme. The programme is divided into two parts, the first comprising news and interviews collected from all over the territory. The

second is a serial play entitled "Mzee Simba" and describes the day-to-day activities of the average farmer. It was the practice during the year to repeat each programme once, thus having two fresh programmes per month. From January 1961, however, there will be a fresh programme weekly. Items featured in news, interviews and plays during the year included cotton spraying, vegetable growing, interviews with Master Growers on the East African Tobacco Company's scheme near Tabora, fishing, soil conservation and soya beans.

SECTION XIII

FISHERIES

Fisheries—General

Tanganyika's total fish production for the year is again estimated at 50,000 tons (fresh weight) valued at £2½ million. Of this quantity, approximately 10 per cent comes from the sea and the balance from inland waters. Fish rarely passes through produce markets, there are no complete records of the considerable exports of dried and smoked fish to neighbouring territories and it is impossible, with the existing staff, to organize a territory-wide collection of statistics of fish landings. It is therefore gratifying to record that final approval was given for a Fisheries Economist of the Food and Agriculture Organization to begin an Economic Survey of Tanganyika's fisheries in mid-1961. This should give a more accurate picture of the volume, value and distribution of the fish trade.

In general this was a prosperous year for the fishing industry as increasing amounts of cash from crops became available for the purchase of food. In some areas there are signs that the local industry is hard put to it to keep pace with local demands and there are considerable intra-territorial movements of dried and smoked fish products, e.g., of inland fish to the larger coastal markets and of Central Province fish to the Lake Province.

Marine Fisheries

There was considerable interest by non-native enterprise in sea fisheries this year. Several smaller enterprises failed due to under-capitalisation, lack of skill and an overdependence on the purchase of supplies of fish from African fishermen to meet advance contracts. African fishermen have no difficulty in disposing of all their catch themselves at reasonable prices through existing channels. This is particularly true of such luxury articles as crawfish which are sold direct to the consumer.

Of the enterprises in force at the end of the year the most promising were the exploitation of the prawn stocks of the Rufiji Delta and a well found ring netting (purse seining) unit. This latter unit, manned by Greek experts, with previous considerable success with this fishing method in the Congo waters of Lake Tanganyika, commenced exploratory fishing in coastal waters at the turn of the year.

The native inshore industry continued to show interest in the advantages of new or improved fishing gear made from synthetic fibres. There was a considerable increase in the use of monofilament nylon fishing lines and various types of small mesh nylon netting. African fishermen continue to invest in the large 6-inch mesh blue nylon "shark net". A loan for the purchase of such a net is the most popular item for which fishermen apply to the African Productivity Loan Fund but there is an increasing tendency for them to purchase such nets outright from profits.

In Southern Province alone, the number of such nets in use rose from 23 in 1959 to 80 last year. These nets are expensive, costing from Shs. 1,300/- to Shs. 1,700/- each and there was an unfortunate inclination in the Southern Province to skimp on the essential accessories such as headlines and buoys, which resulted in the total loss of several nets. The Department was actively engaged in persuading fishermen to use the best available ancillary gear with these nets. Where loans are applied for, the whole set of recommended gear can be supplied complete with the net.

As far as mechanization of craft is concerned, demonstrations continued with an indigenous type of boat mechanized by an inboard motor, but these did not lead to any active demand from fishermen for the acquisition of inboard engines or conversion of craft. Whilst the increased profits to be obtained from using new or improved fishing gear are easily and rapidly demonstrable and, in most instances the capital outlay for such items can be speedily recovered, these features do not apply to engines. The advantages of being able to range further afield and to be independent of wind and tide are not always apparent to

fishermen. There is, however, an increasing interest in outboard engines, notably in Tanga Province where, due to the energies of the importers, about ninety engines have now been sold to Africans.

One of the problems in areas remote from the larger markets is the production of dried and smoked fish of good keeping quality, especially during the wet season. Experiments now in hand in the kiln smoking of fish in Kilwa District are showing promising results.

The trade in sea shells enjoyed a boom. The East African trade is centred in Zanzibar, whence the overseas exports are made and much of the production reflected in Zanzibar's export figures comes from the Tanganyika coast, especially from the southern region. One African from Mikindani engaged in collecting shells and transporting them to Zanzibar earned Shs. 4,000/- per month this year.

Inland Fisheries

Some concern was felt early in the year for the prosperity of the two largest inland fisheries, those of Lakes Tanganyika and Victoria, due to loss of the Congo markets. There was very considerable direct export of dried *dagaa* (*Stolothrissa*) from the waters of Lake Tanganyika to Congo markets for many years. Fortunately the loss of these markets coincided with increasing demands from the Central African Federation and the bulk of exports is now channelled through the Northern Rhodesian port of Mpulungu at the south end of the lake. The effect of the Congo on Lake Victoria is an indirect one. The largest export market for smoked fish from Lake Victoria is to Uganda. Tanganyika benefited from a brisk demand there because the bulk of production from Uganda's western lakes was in turn exported to the Congo. With the loss of these markets Uganda had little choice but to dispose of these fish internally. The effects on our exports to Uganda are not yet particularly apparent since the type and quality of our smoked fish enjoys a high reputation in eastern Uganda.

The Department became responsible from 1st July for the investigational and development work on the fisheries of the Tanganyika waters of Lake Victoria which was formerly undertaken by the Lake Victoria Fisheries Service of the East Africa High Commission. Basic research on the Lake Victoria fisheries continues to be undertaken by the East African Freshwater Fisheries Research Organization, Jinja.

The second half of the year was a transitional period in fisheries work on Lake Victoria. A fair degree of reorganization was required as the former staff of the Lake Victoria Fisheries Services are now freed from their responsibilities for licensing and the enforcement of provisions under the Lake Victoria Fisheries Act, which has now been repealed. The emphasis is now on extension work with particular attention to a fuller utilization of species of fish other than *Tilapia*, improvements to fishing boats and improved methods of fish preservation. The programme of stocking the lake with fry of *Tilapia zillii* and *T. nilotica* continues. The excellent facilities which exist at Mwanza led to the drawing up of plans for in-training courses on fisheries work there.

Elsewhere in the territory there continued to be a steady, and in some instances spectacular, development of fisheries on minor waters. In the Central Province the fishery on Lake Kitangiri developed to the point where 600 fishermen operated at the height of the dry season and large canoes were imported by lorry from as far afield as Musoma and Ukerewe. The year's production was estimated at 1,250 tons, most of which was exported to the Lake Province.

The specialized fishery for the catfish (*Clarias mossambicus*) on the Bahi Swamps enjoyed a good year with a production of 1,500 tons.

The programme of stocking and fishing dams in Central Province continued with marked success although, at the end of the year, water levels were very low and concern was expressed at the lateness of the rains. Although there is now a firmly established residential fishing population on the larger dams such as Hombolo and Mianje Mungaa, one of the main functions of these waters is to provide fishing for many itinerant fishermen during the seasons when such waters as Lake Kitangiri and the Bahi Swamps are inaccessible or unfishable.

The successes achieved in developing minor fisheries in the Central and Northern Provinces led to the extension of this type of development to the Western and Eastern Provinces during the year. A Field Officer on full-time fisheries duties was stationed at Tabora for work on the Malagarasi Swamps, the Ugalla River and the dams of Unyamwezi.

The Fisheries Officer stationed at Headquarters started a preliminary survey of the possibilities in Eastern Province, which had covered the rivers and dams of Morogoro, Kilosa and Bagamoyo Districts by the end of the year.

The movement of building family fish ponds or "stew ponds" continued apace in the well-watered western areas of Southern Province. There are now more than 4,000 such ponds in Songea District and 150 in Tunduru. Success with this type of fish pond in the Southern Province stimulated interest in Njombe, Mbeya and other areas of the territory provided with adequate perennial water.

Some interest was shown by overseas enterprise this year in the possibility of Tanganyika as a source of supply of live freshwater fishes for home tropical aquaria.

SECTION XIV

RESEARCH

A full report of the Research Division is given in Part II of the Annual Report. Coffee, sisal and flue-cured tobacco commodity stations, mainly staffed by members of the Department, publish their own reports.

The laboratories and housing for the four Regional Research Centres at Ukiriguru, Tengeru, Ilonga and Nachingwea, provided for under a Colonial Development and Welfare Scheme were completed. A new Colonial Development and Welfare Scheme was approved for the further expansion of the Division, particularly to provide for an increased number of sub-stations, an increase in number of experimental officers and more laboratory and field equipment. The staff position was satisfactory but posts remained vacant for two senior research officers, a plant physiologist and pathologist, an agricultural chemist and six experimental officers.

Soil Fertility

Steady progress continues in this most important line of study. It was shown that the limiting factors in the poor leached sandy soil of Bukoba are principally nitrogen and potassium, the former must be provided by a chemical fertilizer but the latter either by a chemical fertilizer or properly made farmyard manure. Either chemical fertilizers or farmyard manure continue to give excellent increases in yield at Mwanhala and at other stations. There are however certain differences that must be examined further, e.g., groundnuts respond well to farmyard manure at Mwanhala but not at Nachingwea.

Date of Planting

Results are gradually accruing to suggest that the date of planting effect, i.e. much lower yields at later dates of planting, may be related to specific characters in the crops concerned. If this proves to be the case, plant breeding might produce some lessening of the effect.

Intercropping

Useful increases in production per acre were obtained by planting castor with groundnuts or soya beans and maize with sesame.

Irrigation

The problem of improving the very saline soils of Kalimawe was studied in the laboratory. The addition of two tons of gypsum per acre doubled the rate of water penetration but this was still slow in relation to the evaporation rate. Yields of maize in the field leaching experiments were low, rarely reaching 1,000 lb. per acre.

Cotton

Sulphate of ammonia applied as a top dressing gave an appreciably higher increase in yield than when applied in the seedbed at Ukiriguru. Fertilizer and farmyard manure gave big increases in yield at Kilangali in Eastern Province.

Testing of the more recent Ukiriguru seed issues continued over the whole range of Lake Province conditions. Yields of all issues were appreciably higher than the original MZ.561, particularly in the drier areas, and later issues were generally higher yielding than the earlier issues and more resistant to jassid attack.

At Ilonga, various combinations of improved strains for possible issue showed an advance in yield, ginning out-turn and jassid resistance. Testing of introduced bacterial blight-resistant varieties was started.

Fusarium wilt is continuing to spread in Lake Province and a detailed programme of study and selection of resistant varieties was planned.

Coffee

At Mbozi, hedge coffee gave excellent yields of the order of 15 cwt. per acre. Copper spray application on external trials showed better leaf retention and increased yields.

At Maruku and its associated district plots useful results were obtained in the variety trials and cultural experiments, comparing pure stands of coffee with inter-planting with bananas and in various methods of satisfactorily establishing coffee in the early years.

Tea

At Maruku, farmyard manure increased growth and assisted in frame formation on bushes planted at the end of 1957. Sulphate of ammonia gave greatly increased yields and mulching was particularly valuable.

Cereal Crops

Work to issue new varieties of wheat to replace those attacked by stem rust continued satisfactorily in spite of the great difficulties experienced by the breaking down of rust resistance in successive issues.

Legume Crops

New varieties of soya beans bred at Nachingwea were issued to the Tanganyika Agricultural Corporation for extended field trials. The large collection of strains were examined to select high oil yielding types, in an effort to widen the export possibilities of this crop. At higher altitudes the Nachingwea varieties were very suitable for fodder production only. However, the Southern Rhodesian dwarf varieties maintained their early promise of good yields at high altitudes.

The cause of "oily pod" of french beans was found to be a virus.

Promising varieties of canning beans were found, which were resistant to one or both of the two races of rust found in Northern Province.

Oil Seeds

The sesame variety Morada still maintains its general superiority in yield over local varieties and crosses between it and other varieties show promise of higher yields. The work to produce varieties with a lower susceptibility to shattering continued.

Work began at Chambezi to study the effect of various methods of cultivation on yield of coconuts.

A large programme of research on cashew was started based on Nachingwea; this included vegetative propagation, tree selection for seed production, spacing and fertilizer experiments, thinning of mature plantations and the rejuvenation of old trees.

Tobacco

The form in which nitrogenous fertilizers were applied to flue-cured tobacco had no effect on yields or quality at Urambo, but a high rate of application increased yields considerably and reduced grade index slightly on early planted tobacco. A very high rate of application tended to reduce yields and grade index. Nitrogen increased yields on both red and grey sub-soil types as did potash on the grey sub-soil and phosphate on the red sub-soil. Yields were appreciably greater after two years of Rhodes grass than after two years of arable cropping; grade index was also considerably higher after grass.

An experiment to determine the best place in the local rotation for dark fired tobacco was started at Soluti (Songea).

Pyrethrum

The new soil fertility programme in the Njombe District started well. In the first year phosphate, calcium and nitrogen gave increased yields. A number of clones with, between them, desirable characters for producing improved varieties were identified and are being crossed with each other.

Cocoa

Many trial plots to determine local conditions necessary for cocoa establishment were set out. In soil surveys in the foothills of the Eastern Usambaras it was possible to correlate soil conditions with the growth of young cocoa and in some instances with more mature cocoa. The results will be of value for deciding more accurately than heretofore new areas for establishing cocoa.

Pasture Research

A programme was started at Ukiriguru. The maximum production of standing hay was produced by resting early, in late January, but even so, the production was miserably low on the soil type studied, namely dark grey cemented clays. In the grazing management experiment, rotational grazing with standing hay gave the least loss of weight between August and October. Various pure and mixed grass species were established under maize to determine which is most suitable for this method of seeding pasture.

At Nachingwea, well-managed Rhodes grass was very much more productive than natural pasture. Elephant grass continued to give the highest production at Tengeru in the comparative production trial, followed by *Seteria splendida*. Russian comfrey and edible canna also gave good yields. Rhodes grass was not included in this trial but, in a separate trial comparing two varieties, "Rongai" convincingly outyielded "Mpwapwa", its yields over three years being greater than those of the elephant grass referred to above. Single plant selections of Rhodes grass showed very considerable variations in yield and habit and such work will lead to great improvements over the varieties at present available.

Miscellaneous

The difficulties, principally supervisory, in setting up trial management farms, to test the results of research under ordinary farming conditions, were increasingly overcome.

The extensive series of experiments and observation plots of a wide range of crops on sub-stations and local plots were continued. The results will be of great value for planning improved farming systems in future years.

Experiments testing the value of aldrin and dieldrin were continued at Nachingwea. Termite attack on crops tested was not so severe this year as in 1959, perhaps because during a wet year termites do not attack living plants to nearly the same extent as during a dry one. Significant increases in yield were rarely obtained, but appreciable increases in plant populations at harvest were recorded in all experiments except one on sunflower, but here mouse damage at emergence was considerably reduced by aldrin seed dressings.

SECTION XV

NUTRITION

Much of the field work of the Agricultural Department staff has a direct bearing on the improvement of nutrition of the people. In particular, the efforts to increase the growing of legume crops, vegetables and fruits and the encouragement of fishing, improvement of animal husbandry and distribution of improved cockerels, all serve to improve the nutrition and hence the health and energy of the people. Agricultural Department staff is co-operating with the Medical Department, especially in North Pare, Songea, Babati and Tabora, in their schemes for improving the nutrition and health of the people.

SECTION XVI

LEGISLATION

The most important legislation affecting agriculture which was promulgated during the year was as follows:—

(a) Ordinances.

(1) An Ordinance to Amend the Cotton Ordinance (Cap. 362).

The more important of the amendments were designed to maintain standards of quality and to provide for increased participation by co-operative societies in primary marketing.

(2) An Ordinance to Amend the Fisheries Ordinance (Cap. 295).

The amendments applied the Fisheries Ordinance to Lake Victoria, hitherto regulated under the Lake Victoria Fisheries Act which became inoperative on the dissolution of the High Commission's Lake Victoria Fisheries Service.

(3) The Pyrethrum Ordinance (Cap. 421).

This repealed and replaced the Pyrethrum Industry Ordinance in order to make better provision for the regulation, improvement and development of the Pyrethrum Industry.

(b) *Rules and Orders.*

(1) The Plant Protection (Control of *Trogoderma granarium*) Rules, 1960 and Order, 1960 replaced the previous Orders. The Rules provide for control measures on produce and stores found or suspected to be infested within the territory and the Order for control measures on imported produce and articles.

(2) The Cotton (Amendment) Rules, 1960, made provision for more effective control of pests in cotton stores, fire prevention and lint standards.

(3) The Cotton (Quarantine Area) Southern Highlands and Western Provinces Order, 1960 restricts the growing of cotton to a scheduled area and then only on an authority issued by the Commissioner for Agriculture.

SECTION XVII

BOARDS AND COMMITTEES

The following appointments were held by members of Headquarters staff:—

COMMISSIONER

Chairman:

Lint and Seed Marketing Board.

Cotton Board.

Seeds Board.

Coffee Licensing Authority.

Member:

Tanganyika Agricultural Corporation Board.

Land Bank Board.

Tea Board.

Pyrethrum Board.

Coffee Board.

Civil Service Advisory Board.

Maize Advisory Committee.

Central Advisory Committee on Nutrition.

Governing Body, Tea Research Institute of East Africa.

Agricultural Research Co-ordinating Committee (East Africa High Commission).

Animal Industry Co-ordinating Committee (East Africa High Commission).

Technical Co-ordinating Committee (East Africa High Commission).

Roads Advisory Committee.

Dar es Salaam Chamber of Commerce.

Research and Mlingano Management Committee of the Tanganyika Sisal Growers' Association.

DEPUTY COMMISSIONER

Member:

International Red Locust Control Service.

SECTION XVIII

STAFF

I continued to direct the Department during 1960 and my title was altered to that of Commissioner for Agriculture to fit in with the constitutional developments taking place in the territory. The posts of Deputy Director and Assistant Director were similarly altered to Deputy Commissioner and Assistant Commissioner. Two Agricultural Officers, Mr. A. H. B. Childs and Mr. K. Johansen, were promoted to Senior Agricultural Officer. Mr. R. Briggs, Agricultural Officer, was transferred from Somaliland and Mr. M. H. Atkinson, Fisheries Officer, transferred from the Lake Victoria Fisheries Service. Two Field Officers Mr. W. D. Gibbons and Mr. E. C. Green, were promoted to Agricultural Officer (Tanganyika). Four new Agricultural Officers were posted to Tanganyika after the Cambridge and Trinidad Course, Messrs. M. A. Scaife, B. L. Honess, R. A. Haggarty and C. G. Groom. Three Agricultural Officers and one Fisheries Officer resigned and one was not confirmed. Mr. J. C. P. Driessen was transferred from Field Officer to Tobacco Officer and Mr. J. Moss was appointed as Tobacco Officer, Messrs. R. Simpson, R. A. Brown, L. B. Neary and S. M. Clarke were promoted from Field Officer to Senior Field Officer, Mr. D. Shepstone, Senior Field Officer, retired after 22 years in the Agricultural Department. Mr. D. H. Thwaites, Field Officer, was appointed Inspector, Produce Inspection Service.

Eleven Field Officers and Senior Field Officers retired or resigned. Eleven new Field Officers were appointed, four of these from Makerere and Allahabad, five from the United Kingdom, one a local appointment and one, Mr. Chausa, the first promotion from Senior Field Assistant. Mr. E. P. de Souza was promoted from Clerk, Upper Division, to Assistant Inspector, Produce Inspection Service. Mr. A. H. Matthysen, Agricultural Foreman, resigned.

On the Research side, Mr. T. O. Robson, Pasture Research Officer, and Mr. B. C. Akehurst, Agricultural Officer, were promoted to Senior Research Officer and Mr. J. B. D. Robinson was appointed to the vacancy in Senior Research Officer Grade B. Mr. F. M. Spencer, Agricultural Officer, was promoted to Chief Agricultural Officer in the Solomon Islands. Mr. J. T. Barton, formerly a Field Officer in Tanganyika, returned, after taking a degree, as Agricultural Officer in charge of Irrigation. Two Chemists, Messrs. K. G. Pickles and J. Evans, were appointed and one, Mr. J. C. Warden, resigned. Mr. A. Sreedharan was promoted from Assistant Agricultural Officer to Experimental Officer.

On the Administrative and secretarial side, Mr. J. I. de Souza was appointed Office Supervisor. Six Stenographers/Personal Secretaries left the Department during the year and four joined. Officers on the Accounts side have now been transferred to the Ministry. Fifteen clerks left the Department on promotion, resignation, etc., and only two were replaced by transfers from other Departments.

The number of Senior Field Assistant posts in the Department was increased by 15, making a total of 36; 32 Field Assistants were promoted to these new posts. Field Assistant posts were increased by 74, making a total establishment of 779, and the establishment of Subordinate Service Instructors was reduced by 62; 35 Agricultural Instructors were promoted to Field Assistant.

SECTION XIX

POLICY

Despite the far-reaching changes in Government achieved in 1960, there was no substantial change in agricultural policy from the general statement given in the 1959 report.

Further progress was made in the encouragement of the individual farmer who showed himself responsive to advice. Departmental staff assisted in co-operative farms and settlements; Co-operative Unions took an increasing part in executive duties such as spraying of coffee, supervision of coffee nurseries and distribution of fertilizers and insecticides.

SECTION XX

CONCLUSION

I am very appreciative of the loyal support and conscientious work of all grades of staff throughout the year. To many it was a year of uncertainty and vicissitudes but there was no lowering of standards of work. I also wish to record my appreciation of the co-operation and support the Department had during the year from other officers of Government, particularly the Provincial Administration and the Departments of the Ministry of Agriculture and Co-operative Development. I am indebted to all those who have given freely of their time to serve on Boards and Committees for the improvement of Agriculture in the Country.

A. P. S. FORBES,
Commissioner for Agriculture

MONTHLY RAINFALL IN INCHES FOR SEASON 1959/60 AND YEAR 1960 AT PROVINCIAL STATIONS

	Morogoro Reg. No. 96.3700		Dodoma Reg. No. 96.3501		Tabora Reg. No. 95.3212		Mwanza Reg. No. 92.3209		Mbeya Reg. No. 98.3301		Arusha Reg. No. 93.3601		Tanga Reg. No. 95.3900		Mtwara Reg. No. 100.4004		Bukoba Reg. No. 91.3102	
	1959 Av.	42 Yrs. Av.	1959 Av.	32 Yrs. Av.	1959 Av.	8 Yrs. Av.	1959 Av.	10 Yrs. Av.	1959 Av.	28 Yrs. Av.	1959 Av.	36 Yrs. Av.	1959 Av.	31 Yrs. Av.	1959 Av.	8 Yrs. Av.	1959 Av.	39 Yrs. Av.
October, 1959	1.45	0.91	1.26	0.16	1.39	0.52	5.26	2.02	2.70	0.48	1.68	1.34	2.57	4.03	1.06	0.91	4.00	5.03
November, 1959	0.95	2.04	1.21	0.78	8.64	1.54	5.71	3.48	2.97	2.03	2.59	4.75	1.84	4.17	0.49	1.27	4.96	6.38
December, 1959	3.48	2.80	5.19	4.03	4.98	6.60	3.16	6.73	7.37	5.55	6.15	3.99	0.85	3.22	20.39	8.66	7.09	7.53
January, 1960	6.10	7.63	12.78	5.74	7.84	5.76	8.12	3.24	7.43	7.70	2.62	2.31	0.33	1.28	6.99	7.78	7.89	5.84
February, 1960	2.25	4.02	6.56	4.47	11.48	4.58	2.34	3.06	8.05	6.42	2.01	3.58	0.08	1.69	8.21	5.55	11.84	9.07
March, 1960	9.44	6.61	6.94	2.03	5.98	4.35	7.13	5.52	5.69	4.67	1.90	2.19	1.31	1.11	15.83	6.39	20.59	11.41
April, 1960	15.42	10.27	10.27	0.21	0.40	1.16	0.63	3.47	1.19	0.66	5.81	8.08	5.71	12.82	2.26	1.80	13.39	14.15
May, 1960	1.42	3.87	0.02	0.21	0.00	0.00	0.33	0.50	0.19	0.04	0.71	1.24	2.68	3.01	2.15	0.27	3.90	3.33
June, 1960	1.53	1.03	0.00	0.04	0.00	0.00	0.00	0.85	0.00	0.02	0.04	0.57	0.93	2.20	0.11	0.53	0.00	1.89
July, 1960	0.09	0.51	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.04	0.01	0.69	1.48	2.83	0.19	0.32	1.19	3.19
August, 1960	0.14	0.42	0.00	0.00	0.00	0.04	0.48	1.31	0.27	0.10	0.00	0.73	0.01	3.19	0.64	3.37	8.72	4.01
September, 1960	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total for season	42.43	...	37.10	22.43	45.23	...	43.85	...	45.76	...	55.04	...	44.06	...	66.95	...	91.76	...
Average for seasons	...	38.59	...	...	31.22	...	36.76	...	33.80	...	47.45	...	52.53	...	42.67	...	79.44	...
October, 1960	1.49	0.92	0.00	0.00	1.22	0.63	0.72	2.34	0.01	0.56	2.20	1.36	5.13	4.05	0.39	0.83	0.29	5.01
November, 1960	0.01	2.02	0.01	0.78	1.94	2.42	2.38	3.70	0.35	2.04	0.00	4.62	0.97	4.09	0.00	1.38	4.72	6.34
December, 1960	0.19	2.82	0.56	4.06	2.98	6.40	0.89	6.38	6.21	5.62	0.38	5.89	0.15	3.15	0.15	10.13	5.13	7.52
Total for 1960	37.99	...	30.07	...	36.46	...	33.80	...	39.89	...	47.20	...	44.75	...	45.35	...	85.86	...
Average for years	...	38.60	...	22.80	32.01	...	37.95	...	33.96	...	47.07	...	52.34	...	44.07	...	79.37	...

CROP PRODUCTION FIGURES

SISAL

Year	Production in tons		
1956	...	...	185,762
1957	...	...	184,877
1958	...	...	196,567
1959	...	...	205,273
1960	...	...	204,868

COFFEE

Mild Coffee

Tons of clean coffee

Province	1957	1958	1959	1960
Northern	9,350	8,475	10,303	16,585
Southern Highlands ...	1,467	2,467	2,744	2,996
Southern	500	626	1,083	1,135
Tanga	300	515	513	656
Eastern	—	—	3	6
	11,617	12,083	14,646	21,378

Hard Coffee

Tons of clean coffee

Province	1957	1958	1959	1960
West Lake	*	*	8,948	8,570
Eastern	400	255	265	1,004
Lake	10,200	9,040	55	36
Tanga	50	48	88	64
Western	—	35	67	72
	10,650	9,742	9,423	9,746

*Figures have previously been included in Lake Province production.

COTTON

Production in Bales of 400 lb.

Province	1956	1957	1958	1959	1960
Lake	121,304	151,322	151,608	182,623	160,652
Eastern	8,730	12,500	14,421	13,313	16,547
Tanga	2,275	2,245	2,518	2,307	4,148
Northern	1,244	2,212	1,947	2,135	5,000
Western	—	732	897	914	1,906
Southern	38	50	42	—	—
West Lake	—	—	—	316	318
	133,591	169,061	171,433	201,608	188,571

CASHEWNUITS

Tons of nuts sold through local markets

Province	1956	1957	1958	1959	1960
Southern	14,363	20,500	18,679	24,102	41,288
Tanga	—	—	—	20	52
Eastern	2,284	2,900	1,877	4,279	13,912
	16,647	23,400	20,556	28,401	55,252

CASSAVA

Tons sold through local markets

Province	1956	1957	1958	1959	1960
Southern ...	21,387	19,600	20,929	17,761	13,859
Western ...	9,648	4,600	5,888	6,180	2,937
Lake ...	100	1,100	1,624	2,750	11,500
Eastern ...	337	100	168	359	1,352
Tanga ...	—	—	56	—	9
Central ...	—	—	18	127	2
Southern Highlands ...	—	—	—	15	—
	31,472	25,400	28,679	27,192	29,659

COCONUTS
Tons of Copra

Province	1956	1957	1958	1959	1960
Eastern ...	4,204	4,000	5,423	5,218	4,855
Tanga ...	4,607	3,500	4,533	5,751	4,210
Southern ...	852	800	999	637	479
	9,663	8,300	10,955	11,606	9,544

MAIZE
Tons sold through local markets

Province	1956	1957	1958	1959	1960
Northern...	26,000	20,000	26,500	22,000	26,000
Southern Highlands ...	7,250	5,200	15,282	13,865	13,893
Western ...	7,615	7,800	8,048	11,400	14,046
Eastern ...	6,560	7,300	6,000	7,355	5,793
Lake ...	3,687	4,300	5,178	5,289	5,101
Southern ...	3,990	5,500	3,007	5,273	5,120
Tanga ...	2,248	1,000	2,305	2,366	4,333
Central ...	2,650	600	1,394	2,575	3,413
West Lake ...	*	*	*	31	247
	60,000	51,700	67,714	70,154	77,946

OIL SEEDS
(a) *Castor Seed*

Tons sold through local markets

Province	1956	1957	1958	1959	1960
Central ...	12,012	13,894	3,030	3,207	5,833
Northern...			1,700	1,615	1,850
Southern ...			1,114	847	823
Eastern ...			747	619	1,525
Southern Highlands ...			322	451	386
Lake ...			48	—	—
Western ...			12	30	45
Tanga ...			—	87	407
West Lake ...			—	58	56
	12,012	13,894	6,973	6,194	10,925

(b) *Cotton seed*
Tons surplus to seed requirements

Province	1957	1958	1959	1960
Lake ...	41,500	47,871	54,900	45,433
Eastern ...	3,900	4,593	4,100	4,334
Northern ...	500	1,450	650	1,650
Tanga ...	400	1,092	850	900
West Lake ...	—	—	50	50
Western ...	—	—	350	450
	46,300	55,006	60,900	52,817

*Have been included in Lake Province figures.

(c) *Groundnuts*

Tons sold through local markets

<i>Province</i>	1956	1957	1958	1959	1960
Western	6,035 ...	5,500 ...	3,597 ...	3,900 ...	11,000
Central	2,096 ...	2,700 ...	3,268 ...	7,725 ...	6,772
Southern	4,158 ...	3,200 ...	1,575 ...	3,406 ...	3,624
Lake	2,081 ...	2,500 ...	937 ...	677 ...	1,235
Northern... ..	211 ...	500 ...	200 ...	60 ...	40
Southern Highlands	79 ...	200 ...	129 ...	140 ...	135
Eastern	— ...	700 ...	— ...	10 ...	11
West Lake	— ...	— ...	— ...	9 ...	32
	<u>14,660 ...</u>	<u>15,300 ...</u>	<u>9,706 ...</u>	<u>15,927 ...</u>	<u>22,852</u>

(d) *Sesame*

Tons sold through local markets

<i>Province</i>	1956	1957	1958	1959	1960
Southern	6,176 ...	5,900 ...	6,236 ...	8,673 ...	7,290
Eastern	558 ...	400 ...	556 ...	812 ...	1,171
Southern Highlands	— ...	— ...	151 ...	345 ...	339
Lake	65 ...	100 ...	63 ...	178 ...	270
Western	45 ...	50 ...	41 ...	75 ...	320
Central	50 ...	50 ...	1 ...	77 ...	87
Tanga	— ...	— ...	— ...	— ...	5
	<u>6,894 ...</u>	<u>6,500 ...</u>	<u>7,048 ...</u>	<u>10,160 ...</u>	<u>9,482</u>

(e) *Sunflower*

Tons sold through local markets

<i>Province</i>	1956	1957	1958	1959	1960
Eastern	1,326 ...	2,600 ...	2,717 ...	181 ...	676
Western	3,482 ...	4,000 ...	2,516 ...	2,200 ...	3,766
Southern Highlands	701 ...	1,000 ...	1,099 ...	988 ...	1,085
Southern	738 ...	2,500 ...	1,024 ...	480 ...	646
Lake	886 ...	1,000 ...	737 ...	143 ...	363
Central	356 ...	400 ...	347 ...	626 ...	706
Northern... ..	451 ...	1,100 ...	320 ...	100 ...	65
Tanga	17 ...	50 ...	87 ...	17 ...	7
	<u>7,957 ...</u>	<u>12,650 ...</u>	<u>8,847 ...</u>	<u>4,735 ...</u>	<u>7,314</u>

RICE

Tons of paddy sold through local markets

<i>Province</i>	1956	1957	1958	1959	1960
Lake	2,781 ...	6,000 ...	8,647 ...	4,172 ...	2,559
Southern Highlands	2,709 ...	5,100 ...	8,450 ...	7,070 ...	3,108
Eastern	2,319 ...	8,300 ...	5,864 ...	7,078 ...	11,450
Western	2,230 ...	4,000 ...	3,025 ...	2,950 ...	10,311
Tanga	2,436 ...	3,000 ...	2,467 ...	6,513 ...	4,564
Southern	1,835 ...	1,400 ...	1,271 ...	2,279 ...	2,433
Northern	51 ...	50 ...	160 ...	260 ...	400
Central	— ...	— ...	25 ...	40 ...	34
	<u>14,361 ...</u>	<u>27,850 ...</u>	<u>29,909 ...</u>	<u>30,362 ...</u>	<u>34,859</u>

PULSES

(Including yellow peas, chickpeas, soya, mixed beans, cowpeas, grams, pigeon peas, bambarra nuts)

Province	1956	1957	1958	1959	1960
Northern	4,147 ...	1,600 ...	3,640 ...	6,189 ...	10,210
Lake	2,299 ...	3,500 ...	3,099 ...	965 ...	1,094
Southern Highlands ...	2,208 ...	1,600 ...	2,077 ...	2,690 ...	2,126
Southern	2,794 ...	4,000 ...	1,672 ...	1,763 ...	5,721
Western	1,892 ...	1,800 ...	1,039 ...	1,690 ...	2,569
Tanga	276 ...	800 ...	624 ...	600 ...	924
Eastern	592 ...	800 ...	603 ...	1,201 ...	845
Central	106 ...	100 ...	49 ...	— ...	294
West Lake	— ...	— ...	— ...	200 ...	660
	<u>14,314 ...</u>	<u>14,200 ...</u>	<u>12,803 ...</u>	<u>15,298 ...</u>	<u>24,443</u>

PYRETHRUM

Tons of dried flowers

Province	1956	1957	1958	1959	1960
Northern	479 ...	446 ...	376 ...	483 ...	553
Southern Highlands ...	261 ...	291 ...	249 ...	316 ...	457
	<u>740 ...</u>	<u>737 ...</u>	<u>625 ...</u>	<u>799 ...</u>	<u>1,010</u>

SEED BEANS

Tons exported

Province	1955/56	1956/57	1957/58	1958/59	1959/60
Northern	2,549 ...	1,247 ...	3,420 ...	3,885 ...	5,000
Southern Highlands ...	— ...	— ...	— ...	3 ...	21
	<u>2,549 ...</u>	<u>1,247 ...</u>	<u>3,420 ...</u>	<u>3,888 ...</u>	<u>5,021</u>

TEA

Manufactured in lb.

Province	1956	1957	1958	1959	1960
Southern Highlands	3,520,893 ...	3,993,407 ...	4,122,245 ...	5,202,810 ...	5,003,750
Tanga	1,832,139 ...	2,132,177 ...	2,205,929 ...	2,951,724 ...	3,201,764
	<u>5,353,032 ...</u>	<u>6,125,584 ...</u>	<u>6,328,174 ...</u>	<u>8,154,534 ...</u>	<u>8,205,514</u>

TOBACCO

(b) *Flue-cured*

Cured leaf in lb.

Province	1956	1957	1958	1959	1960
Southern Highlands	2,738,283 ...	2,735,000 ...	2,748,480 ...	3,589,488 ...	2,861,736
Western	572,925 ...	773,000 ...	927,360 ...	1,164,800 ...	1,108,800
Southern	112,000 ...	134,000 ...	17,920 ...	6,720 ...	—
Lake	— ...	2,000 ...	— ...	— ...	—
West Lake... ..	— ...	— ...	— ...	8,960 ...	—
	<u>3,423,208 ...</u>	<u>3,644,000 ...</u>	<u>3,693,760 ...</u>	<u>4,769,968 ...</u>	<u>3,970,536</u>

(b) *Fire-cured*

Cured leaf in lb.

Province	1956	1957	1958	*1959	1960
Southern (Songea)	647,535 ...	598,000 ...	1,272,320 ...	1,144,640 ...	1,046,080
Eastern	— ...	— ...	389,760 ...	— ...	—
West Lake (Nyami-rembe)	545,720 ...	473,000 ...	85,120 ...	206,080 ...	51,520
	<u>1,193,255 ...</u>	<u>1,071,000 ...</u>	<u>1,792,200 ...</u>	<u>1,350,720 ...</u>	<u>1,097,600</u>

*1959 figures corrected.

WATTLE EXTRACT
Production in tons

<i>Province</i>	1960
Tanga	480
Southern Highlands	6,115
	6,595

WHEAT
Tons sold through organized markets

<i>Province</i>	1956	1957	1958	1959	1960
Northern	4,237	3,300	5,996	6,910	11,397
Southern	368	300	347	188	158
Southern Highlands	97	200	130	105	—
Western	68	50	59	60	81
Eastern	—	50	29	13	24
	4,770	3,900	6,561	7,276	11,660

SUGAR
Production in tons

<i>Province</i>	1956	1957	1958	1959	1960
Northern	18,025	18,400	21,133	26,791	26,963
West Lake	—	—	—	850	1,661
	18,025	18,400	21,133	27,641	28,624

ONIONS
Tons marketed

<i>Province</i>	1956	1957	1958	1959	1960
Northern	3,911	2,580	1,820	3,575	4,612
Central	272	300	268	1,982	1,584
Southern Highlands	201	210	211	220	200
Southern	22	10	22	40	21
Tanga	53	40	14	520	400
Lake	25	10	10	32	30
Western	21	20	6	5	17
Eastern	150	140	—	162	1,188
West Lake	—	—	—	5	6
	4,655	3,310	2,351	6,541	8,058

GUMS
Arabic and Copal in tons marketed

<i>Province</i>	1956	1957	1958	1959	1960
Western	285	150	235	460	690
Lake	158	150	129	925	655
Central	175	100	111	302	353
Southern	—	50	2	3	2
	618	450	477	1,690	1,700

KAPOK
Tons marketed

<i>Province</i>				1956		1957		1958		1959		1960
Eastern	...	...	...	941	...	1,200	...	732	...	655	...	814
Tanga	...	...	...	415	...	400	...	311	...	236	...	163
Southern	...	...	...	44	...	50	...	13	...	11	...	9
				<u>1,400</u>	...	<u>1,650</u>	...	<u>1,056</u>	...	<u>902</u>	...	<u>986</u>

OIL PALM
(a) Palm oil in tons marketed

<i>Province</i>				1956		1957		1958		1959		1960
Western	...	...	...	47	...	50	...	39	...	50	...	65
Tanga	...	...	...	40	...	30	...	—	...	30	...	30
				<u>87</u>	...	<u>80</u>	...	<u>39</u>	...	<u>80</u>	...	<u>95</u>

(b) Kernels in tons marketed

<i>Province</i>				1956		1957		1958		1959		1960
Western	...	...	...	351	...	350	...	378	...	450	...	726
Tanga	...	...	...	30	...	20	...	—	...	20	...	35
				<u>381</u>	...	<u>370</u>	...	<u>378</u>	...	<u>470</u>	...	<u>761</u>

EXPORTS FROM TANGANYIKA OF AGRICULTURAL PRODUCTS, 1956-1960

		Maximum Exports Prior to 1960	1956 Amount	1957 Amount	1958 Amount	1959 Amount	1960 Amount	Export Value 1960
	Year	Tons	Tons	Tons	Tons	Tons	Tons	£
Sisal ...	1959	208,767	185,588	181,815	198,130	208,767	207,225	15,441,631
Cotton Lint...	1959	30,704	27,890	28,311	30,229	30,704	38,869	8,827,131
Cotton Seed ...	1957	8,387	*	8,386	7,520	5,011	5,460	130,013
Cotton Seed Oil ...	1957	1,981	*	1,981	1,148	1,262	297	25,870
Coffee ...	1958	22,225	21,615	18,481	22,225	19,607	25,077	7,325,669
Beans and Pulses ...	1952	23,184	9,413	5,368	9,521	11,410	11,545	772,512
Beans, Soya ...	1957	1,483	913	1,483	696	1,049	1,330	54,013
Cashewnuts ...	1957	33,651	16,741	33,651	31,310	33,209	36,718	2,125,788
Castor Seed ...	1958	17,858	12,012	13,894	17,858	14,195	18,357	874,320
Cassava ...	1956	24,000	240,000	20,051	17,777	13,690	12,359	176,491
Copra ...	1928	9,318	3,788	236	2,339	3,902	1,010	75,794
Groundnuts ...	1936	22,786	15,143	16,090	12,624	12,124	14,639	1,052,733
Gum Arabic ...	1950	2,319	1,542	684	503	1,843	1,412	138,209
Gum Copal...	1950	110	45	40	13	12	55	3,780
Kapok ...	1957	905	717	905	862	857	863	82,766
Maize ...	1956	106,363	106,363	9,071	1,224	6,163	43,700	757,957
Millets and Sorghum	1955	13,150	5,084	899	2,563	1,797	3,452	54,385
Onions ...	1949	2,418	90	171	40	68	92	2,994
Palm Kernels ...	1959	898	472	454	662	898	922	45,106
Papain ...	1948	130	17	23	68	75	72	93,676
Pyrethrum ...	1945	697	307	292	613	544	1,010	280,780
Rice ...	1938	17,965	1,794	1,853	919	103	457	24,087
Sesame ...	1959	11,208	10,628	8,180	8,496	11,208	10,800	641,549
Sunflower Seed ...	1957	19,626	14,729	19,626	11,557	5,702	12,473	331,880
Tea ...	1959	2,687	1,979	2,176	2,339	2,687	3,160	1,150,671
Tobacco ...	1948	1,421	135	342	217	314	731	89,920
Vegetable Oils ...	1940	2,268	1,468	57	28	200	142	18,027
Wattle Bark ...	1955	4,837	3,178	1,525	865	1,341	1,376	25,414
Wattle Bark Extract	1959	4,980	*	*	*	4,980	6,695	329,842
Other Oilseeds and Oil Nuts ...	1959	1,142	*	*	1,029	1,142	677	16,045
Essential Oils ...	1950	5	4	4	4	5	3	10,544
Total ...	—	—	465,655	376,049	383,379	394,865	460,978	40,979,597

*Figures not available.

